SUPPLEMENT.

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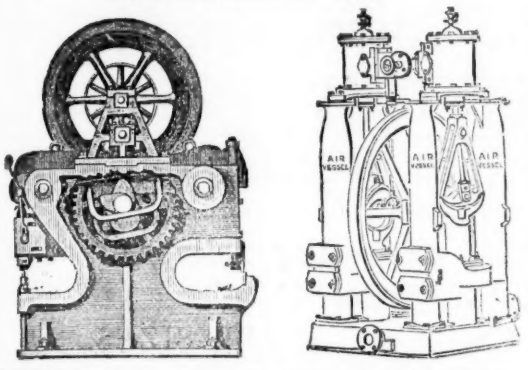

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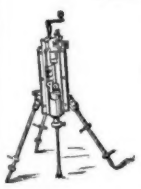

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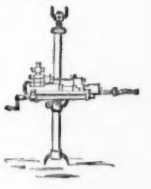

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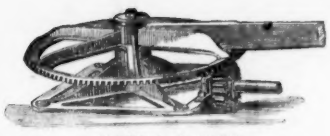

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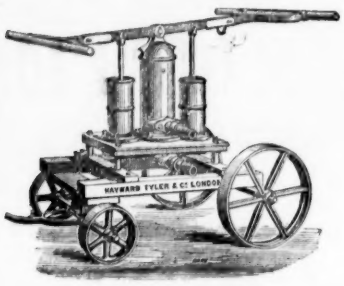

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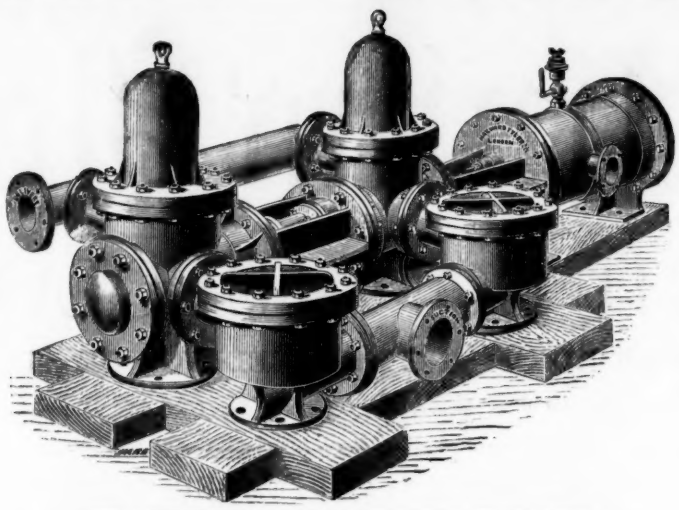

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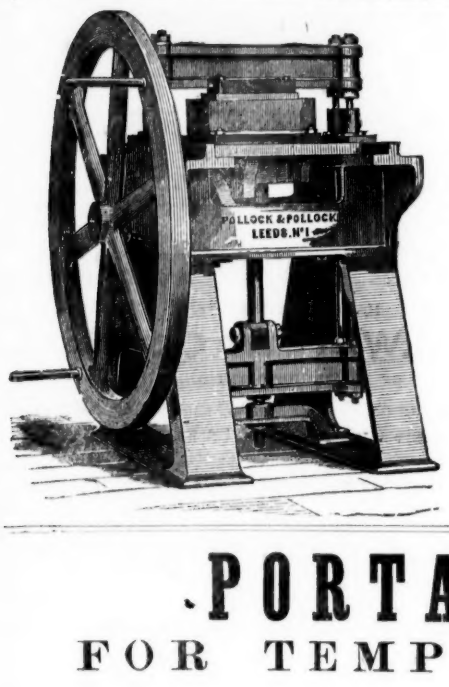

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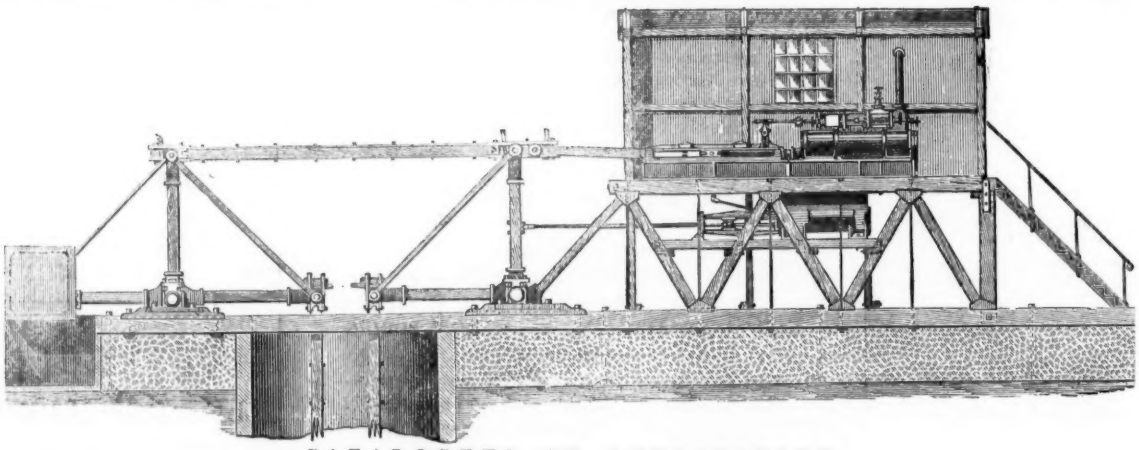

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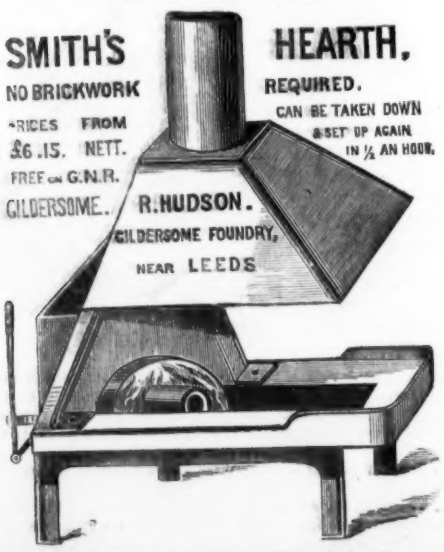

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PRICES ON APPLICATION

THE MINERAL PRODUCE OF THE UNITED KINGDOM FOR THE YEAR 1877.

We have now before us—and at an earlier period than in previous years—the annual volume of "Mineral Statistics of the United Kingdom." In the introduction to the volume it is stated by Mr. ROBERT HUNT that, "although the returns relating to iron ore and iron manufacture were satisfactorily completed by the desired time, it has been found impossible to obtain the other necessary information from mines and collieries, &c., until the end of July." In the annexed summary appears the total value of minerals and metals obtained from the mines, &c., of the United Kingdom in 1877:—

Metals	£18,742,960
Coal	47,113 767
Minerals (earthy, not reduced), salt, clays, &c.	2,424,679
Total value	£68 281,406

Comparing the above aggregate value for the year 1877 with the previous year, the difference is inconsiderable, and shows an increase of some 54.553*l.* The figures for 1876 being 68,226,853*l.* Taking the items included under the first of the above heads—metals, the following figures exhibit the respective quantities and value:—

Metals.	Quantities.	Values.
Gold	Ozs. 143	£ 656
Pig-iron	Tons 6,608 664	16,191 236
Tin	9 500	695,162
Copper	4 470	340 067
Lead	61,403	1,262 600
Zinc	6.281	136,612
Silver from lead	Ozs. 497,375	113,950
Silver from ore	4,060	927
Other metals (estimated)	—	1,750
Total value of metals produced in 1877		£18 742,960

The gold ore is obtained from mines in Merionethshire, in Wales, and Wicklow, in Ireland. Taking the metals in the order in which they occur in the above abstract, pig-iron follows with a total of 6,608,664 tons, compared with 6,555,997 tons in the previous year. Before giving the details of the several iron making districts it may be convenient to precede the information with the production of iron ore, its distribution following with the average prices per ton of the several varieties of pig-iron, together with the lowest and highest prices ranging throughout the year, and the detail of production.

IRON ORE.—The output of the mines working during 1877 shows a total of 16,692,802 tons, compared with 16,841 583 tons in the previous year. The returns are given under two heads—iron mines not under inspection; and ironstone, argillaceous, and blackband wrought under the Coal Mines Regulation Act. The following summary shows the respective quantities and values raised in each iron producing area not under inspection:—

ENGLAND. Counties.	Quantities.	Value.
Cornwall ... Tons	4 963 9	£ 2,920 2 0
Devonshire	6,434 9	3.219 12 6
Somersetshire	51,927 17	36 348 16 0
Gloucestershire	92.974 7	63.261 3 0
Wiltshire	79,176 0	19.794 0 0
Oxfordshire	14,661 0	2 565 13 0
Northamptonshire	1,049,806 6	169 981 3 5
Lincolnshire	508.749 17	76,192 0 0
Staffordshire, North	36 992 11	18 496 5 6
Lancashire	993,012 10	651,169 19 0
Cumberland	1,351.441 14	965,301 17 6
Yorkshire, N. Riding	6,284,545 0	1,021,238 11 0
Northumberland & Durham	51.344 5	30.806 8 0
Westmoreland	8,000 0	4,800 0 0
North Wales	498 0	194 2 0
So. Wales & Monmouthshire	77 320 0	39 471 16 0
IRELAND	155,382 0	85 427 0 0
SCOTLAND	846 0	600 0 0
	10,768,075 0	3,191,788 8 11
Iron ore (argillaceous and blackband) worked under the Coal Mines Regulation Act	5,924,727 0	3.554,880 0 0
Total ... Tons	16 692,802 0	£6,746,668 8 11

The above sources of supply in 1877 are augmented by the residue of the metal extraction works, known as "burnt ore." This residue is obtained from cupreous pyrites from which the copper and sulphur has been extracted, and contains of metallic iron upwards of 60 per cent.; the burnt ore thus obtained in 1877 amounted to 415,000 tons, compared with 300 000 tons in the previous year; while the ores of iron imported in 1877 amounted to 1,142 308 tons, of the value of 1.256,069*l.*, compared with 672.235 tons, of the value of 795,510*l.*, in 1876. Thus it appears the total quantity of iron ores of all varieties available for reduction in the blast furnaces of the country amounted in 1877 to 18,250,110 tons, compared with 17,813,818 tons in the previous year, or an increase of 436.292 tons.

RAILWAY DISTRIBUTION OF IRON ORE.—The extent of the traffic in iron ore carried by some of the leading railways will appear in the following abstract; the figures for 1876 are given for comparison:—

Railways.	1877.	1876.
Midland ... Tons	862,468	775,700
Manchester, Sheffield, and Lincolnshire	293,437	307,581
North Staffordshire	333,504	345,647
Furness Railway—from Lancashire	902 836	833 666
" " Cumberland	1,191.392	1.048 768
Whitehaven, Cleator, and Egremont	1,216 816	1,117,067
North-Eastern	5,547,821	5,426,576

The following prices indicate the value per ton of the several varieties of pig-iron during the year 1877:—

Description of pig iron.	Average price.	Highest price.	Lowest price.
Cleveland	£2 5 6	£2 9 0	£2 3 6
West Cumberland	3 12 9	3 17 6	3 12 6
South Staffordshire	4 2 3	4 5 0	3 18 9
South Wales	3 17 6	3 17 6	3 12 6
Scotch pig	2 14 4	2 17 2	2 12 0

The average prices in the previous year of the above varieties of pig-iron per ton was about 5s. in excess of the above quotations.

PIG-IRON.—Details of production in 1877:—

Districts. ENGLAND.	Furnaces, Built.	Furnaces, In blast.	Pig-iron made. Tons.
Northumberland	4	1	734,438
Durham	70	40	
Yorkshire, North Riding	89	75	1,374 582
Yorkshire, West Riding	48	30	229,027
Derbyshire	53	37	328,203
Lancashire	50	33	624,189
Cumberland	50	26¾	538,156
Shropshire	23	14	102.180
Staffordshire, North	35	25	255,383
Staffordshire, South	146	57	428,276
Northamptonshire	20	13	106 948
Lincolnshire	21	10	116 857
Gloucestershire	9	4	25,602
Wiltshire	7	2	25,150
Hampshire	1	1	
Warwickshire	1	0	
Total of England	627	368¾	4,888,991
NORTH WALES.			
Denbighshire	9	3½	26,715
Flintshire	2	0	
SOUTH WALES.			
Anthracite furnaces	13	4	342,478
Bituminous coal districts. Glamorganshire	76	26	
Bituminous coal districts. Monmouth.	61	30	
Total of North and South Wales	161	63½	737,673

SCOTLAND.	Built.	In blast.	Pig-iron made.
Ayrshire	41	29	306,285
Lanarkshire	90	73	620,474
Fifeshire	6	0	55,241
Linlithgowshire	9	3	
Stirlingshire	5	4	
Argyleshire	1	0	
Total of Scotland	152	109	982,000

In summarising the above returns for 1877 similar information for the previous year is given side by side for comparison:—

	1877. Pig iron.	1877. Coal used.	1876. Pig-iron.	1876. Coal used.
England...Tons	4,888,991	11,038.141	4,664,153	10,871,706
Wales	737.673	1,631,666	788,844	1,676,675
Scotland	982,000	2,672,638	1,103,000	3,050,000
Total	6,608,664	15,342,445	6,555 997	15,598,381

Glancing generally at the above figures it is apparent that economy in the consumption of coal in pig-iron manufacture has become an important point. Thus, from the figures for the past year we have an average of rather more than 46 cwts. of coal to each ton of pig-iron made. In the previous year 47 cwts. were employed, while as a matter of fact 51 cwts. was the quantity used on the average in 1872, and five years previously, in 1867, the quantity was nearly 60 cwts. It should be observed that in all cases where coke has been employed in manufacture its equivalent in coal has been taken.

The total number of blast-furnaces engaged in the production of pig-iron in each of the years 1876 and 1877 appear in the following abstract:—

	1876. Furnaces in blast.	1877. Furnaces in blast.
England	393½	368¾
Wales	73	63½
Scotland	119	109
Total	585½	541¼

MALLEABLE IRONWORKS.—These important works in 1877 show a total number of 300 in Great Britain, and contain 6796 puddling furnaces and 935 rolling mills, of which Scotland possesses 22 works, with 345 puddling furnaces and 53 rolling mills.

BESSEMER AND SIEMENS' STEELWORKS, AND SIEMENS' REGENERATIVE GAS FURNACES.—In each of these industries considerable increase in capacity of works is observable, as well as the names of additional firms which appear in the respective lists pointing to an extension of operations.

TIN-PLATE MANUFACTURE.—Returns under this head show a total production of 4,349,750 boxes of tin, terne, and black plates in the 75 works of the kingdom, employing 211 of the 261 mills erected. The quantities exported in 1877 amounted to 2,819,098 boxes, against 2,400,038 boxes in 1876. The annexed abstract shows the ports and quantities exported from each port in the years 1877 and 1876:—

Ports.	1877. Number of boxes.	1876. Number of boxes.
Liverpool	2,102 620	1,769.313
London	357,159	310 372
Southampton	34,313	67.434
Swansea	102,721	105 615
Hull	14 157	10 263
Glasgow	2 486	2,875
Newcastle	4,153	5.102
Bristol	190,469	125.082
Cardiff	11,020	982
Total Boxes	2,819 098	2.400.038

METALLIC TIN (WHITE TIN), TIN ORE (BLACK TIN).—For many years past the returns of tin ore and metallic tin show a falling off, not so much in quantity as in value. Thus, while in the year 1872 the price per ton of black tin was 87*l.* 7s. per ton, and metallic tin 152*l.* 15s. per ton, we find prices in 1877 have fallen to 40*l.* 10s. and 73*l.* 3s. 6d. respectively, representing a diminished value of upwards of 50 per cent., figures in themselves exhibiting a most discouraging state of affairs in regard to this ancient industry of the western counties of Devon and Cornwall, when alone tin is found in veins, and disseminated through the rocks as well as in the detritus of streams.

The number of mines and streams yielding tin ore in 1877 amounted to 98, producing 14,142 tons, of the value of 572,763*l.*, and giving on reduction to the metallic state 9500 tons, valued at 695,162*l.* In the previous year 135 mines and streams gave a total production of 13,688 tons of black tin, valued at 600,923*l.*, and producing of metallic tin 8500 tons, valued at 675,750*l.* To enable comparison to be made here follows the average prices of tin ore and metallic tin in each of the years 1872, 1876, and 1877:—

Year.	Tin ore.	Metallic tin.
1872	£87 7 0	£152 15 0
1876	43 18 0	79 10 2
1877	40 10 0	73 3 6

The deliveries of Banca tin in Holland in the year 1877 was 131,695 slabs,* compared with 132 033 slabs in the previous year.

The sales of Banca tin in 1877 amounted to 4324 tons, of Billiton 3000 tons, and of Straits shipments 3014 tons: while the shipments of tin from Australia in 1877 from Sydney, Melbourne, and other ports gave a total of 9093 tons.

METALLIC COPPER AND COPPER ORE.—The total number of mines selling ore in 1877 amounted to 101, of these 68 were in Cornwall, 13 in Devonshire, and 1 in each of the counties of Cumberland, Cheshire, and Lancashire, 9 mines in Wales, 1 in the Isle of Man and Scotland, and 6 in Ireland. The total yield of copper ore amounts to 73,141 tons, of the value of 262,270*l.*; the copper obtained was 4470 tons, of the value of 340,067*l.*

The average price of copper ore in 1877 was 4*l.* 4s. 6d. per ton, compared with 4*l.* 17s. the previous year; the average produce was 6¾ in each year, while the average standard, which in 1876 was 113*l.* 8s., fell to 103*l.* 3s. in the year 1877. The average highest and lowest prices of metallic copper in 1877 were as follows per ton:—

	Highest	Lowest
Best selected	£75 16 0	£83 0 0	£70 10 0
Tough cake or ingot	74 12 0	81 10 0	69 0 0
Sheets and sheathing	79 16 0	87 5 0	73 5 0
Australian	75 11 0	83 15 0	72 0 0

In the following abstract appears the respective returns of production of ore and metallic copper for 1876 and 1877 for comparison, the produce of the mines of the United Kingdom:—

ENGLAND. Counties.	1877. Ore.	1877. Copper.	1876. Ore.	1876. Copper.
Cornwall	29,225	2937	43,016	3034
Devonshire	16,707	905	16,276	878
Cumberland	5	½	11	2
Lancashire	646	54	1,007	91
Cheshire	6,288	73½	7,328	79
WALES.				
Cardiganshire	127	8	42	3
Carnarvonshire	395	42	115	8
Merionethshire	—	—	1	—
Montgomeryshire	45	5	47	3
Anglesea	3,613	136	3,692	100
Denbighshire	10	½	—	—
ISLE OF MAN	52	3½	75	4
SCOTLAND	314	6½	680	30
IRELAND	4,949	282	6,816	449
Regulus, preci., &c.	492	16½	146	13
Total United King.	73.141	4470	79.252	4694
Value	£262,270	£340 067	£317,186	£392,300

In the year 1877 the colonial and foreign ores imported into the United Kingdom, including regulus and precipitate, sold at Swansea Ticketings, amounted to 43 217 tons, yielding 5832 tons of fine copper; not sold at ticketings 109,950 tons, yielding 30,750 tons of fine copper, while the burnt ore from pyrites producing copper, and estimated at 425 000 tons, gave of fine copper 17 000 tons. Thus the total quantities of British, foreign, and colonial ores and regulus smelted in the United Kingdom in 1877 amounted to 651,308 tons, yielding 58,052 tons of fine copper.

* 1000 slabs Banca weigh about 32 tons.

METALLIC LEAD AND LEAD ORE, AND SILVER.—The lead mines of the United Kingdom, 347 in number, produced of lead ore in 1877 80,850 tons, valued at 1,123,952*l.*, and yielding on reduction to the metallic state 61 403 tons of lead, of the value of 1,262,600*l.* The silver obtained from this lead amounted to 497,375 ozs., of the value of 113.950*l.*

The average price per ton of lead ore in 1877, rejecting a few low and high priced parcels, was 13*l.* 19s; the highest price obtained was 20*l.* 15s. 6d., and the lowest 12*l.* per ton. The average prices of several varieties of metallic lead appear in the following figures:—

Description of lead.	Average. £ s. d.	Highest. £ s. d.	Lowest. £ s. d.
English	20 11 3	21 17 6	19 2 6
" W.B.	21 7 0	23 0 0	20 0 0
Sheet and bar	21 13 9	23 0 0	20 5 0
Patent shot	24 10 0	25 0 0	24 0 0

The details of production appear in the subjoined summary of lead ore, lead, and silver produced in 1877:—

Counties.	Lead ore. Tons c.	Lead. Tons c.	Silver. Ounces.
ENGLAND.			
Cornwall	2,166 13	1,673 17	23,035
Devonshire	337 10	252 11	4 948
Somersetshire	452 18	310 10	1,555
Derbyshire	5 066 3	3 300 0	—
Shropshire	6,634 9	5,166 3	5,874
Cumberland	3.040 14	2,262 16	14 091
Yorkshire	5,010 17	3,620 12	7,472
Durham & Northumberland	25,086 10	18,984 15	75 686
Westmoreland	1,751 2	1,247 11	16,291
WALES.			
Cardiganshire	5,849 18	4,644 6	47,284
Carmarthenshire	687 2	516 5	2,064
Pembrokeshire	8 0	6 0	36
Radnorshire	90 0	68 0	—
Merionethshire	12 8	9 6	46
Denbighshire	2.897 19	2,337 11	12,900
Montgomeryshire	8,066 16	6.469 4	60,182
Flintshire	3,183 11	2,559 16	17,689
Carnarvonshire	1,581 17	1,211 2	4,692
Glamorganshire	99 0	74 15	—
ISLE OF MAN	4 464 3	3 342 12	186 019
IRELAND	1,655 18	1,241 0	6,205
SCOTLAND	2,706 16	2,105 2	11,306
Total—United Kingdom.	80,850 4	61,403 16	497,375

LEAD IMPORTS AND EXPORTS.—The imports in the year 1877 of pig and sheet lead show a total of 94,412 tons, against 80 713 tons in the previous year, the respective values being 2,015,438*l.* and 1,751,336*l.* The exports in 1877 of pig, rolled, sheet, piping, and tubing amounted to 42,411 tons, of the value of 913,218*l.*, as compared with 35 921 tons, of the value of 809,995*l.* in 1876.

ZINC ORE AND METALLIC ZINC.—The total production of the ores of zinc, principally *sulphides*, from 57 mines, giving returns amounted to 24.405 tons, of the value of 86,151*l.*, the metal obtained being 6833 tons, of the value of 136.670*l.* The prices of the ore and metal show the following variation per ton during the year:—

Description of zinc.	Average.	Highest.	Lowest.
Zinc ore	£ 3 17 4	£ 5 0 0	£ 2 14 0
English spelter	21 15 0	22 10 0	21 0 0
Foreign spelter	20 0 0	21 5 0	19 2 6
Sheet zinc	24 4 0	25 10 0	23 0 0

The zinc ore produced in 1876 amounted to 23,518 tons, of the value of 90,142*l.*; metallic zinc obtained 6041 tons, of the value of 158 011*l.* In the following table appears the production of each county in 1877—

ENGLAND. Counties.	Quantities. Tons.	Value. £ s. d.
Cornwall ... Tons	4,991 2 0	£15.170 14 3
Shropshire	501 13 0	2,192 2 2
Yorkshire	4 17 0	15 0 0
Derbyshire	2 14 1	8 0 0
Cumberland	1,731 10 0	5,609 17 6
WALES.		
Cardiganshire	588 3 2	2,204 10 0
Montgomeryshire	2,714 16 0	10.444 0 0
Denbighshire	2,238 0 0	10,007 18 0
Flintshire	1,873 4 0	7,490 10 0
Carnarvonshire	314 1 3	953 13 2
Radnorshire	87 0 0	467 0 0
ISLE OF MAN	9,043 14 2	30,611 16 3
SCOTLAND	145 0 0	580 0 0
IRELAND	110 0 0	396 0 0
Total	24,405 16 0	£86,151 1 4

IMPORTS AND EXPORTS OF ZINC.—The imports of crude zinc in 1877 amounted to 35,094 tons, of the value of 719,235*l.*, and zinc manufactures, 16,102 tons, of the value of 416 131*l.*, compared with 29,466 tons of crude zinc, of the value of 666,234*l.*, in the previous year, and of zinc manufactures, 14,719 tons, of the value of 411,536*l.*

PYRITES (Mundic, Sulphur, and Arsenical Ores).—The production in 1877 of these ores amounted to 43.948 tons, of the value of 28,225*l.* In the previous year 48 809 tons, of the value of 43,870*l.*, were raised from the mines of the United Kingdom, Cornwall and Ireland producing upwards of 50 per cent. of the total produce. The returns of the various counties appear in the following table:—

ENGLAND. County.	Quantities. Tons.	Value. £ s. d.
Cornwall ... Tons	14 289 10	£ 8,294 3 6
Devon	1 380 14	2,662 5 6
Durham and Northumberland	1,750 0	875 0 0
Lancashire	2,500 0	1,250 0 0
Staffordshire	2,375 0	936 0 0
Yorkshire	1.850 0	647 10 0
Derbyshire	1,910 0	955 0 0
WALES.		
Anglesea	92 0	46 10 0
Carnarvonshire	1,075 19	756 10 0
IRELAND.		
Wicklow	16,725 7	11,802 15 7
Total	43 948 10	£28,225 14 7

The total imports of pyrites of iron and copper into the United Kingdom in 1877 amounted to 679,312 tons, of the value of 1,643,614*l.*, compared with 504,752 tons, of the value of 1,206,799*l.*, in 1876. The total imports in 1877—side by side the returns for 1876 are given for comparison—were received at the following ports:—

	1877—tons.	1876—tons.
Imports into the Mersey	239 622	167,152
" Tyne	189,134	120.869
" London	41 062	38,988
" Hull	25.883	21 237
" Ardrossan	14 498	12,445
" Glasgow	24,731	19,608
" Other ports	144 382	124,453
Total	679,312	504,752

In the beginning of this notice is given an abstract or general summary of the total quantities of metals produced from the ores of the United Kingdom smelted in the year 1877, together with their value. In the following summary will be found a *reusmé* of the mineral produce of the United Kingdom also made to the Mining Record Office in the year 1877:—

Minerals.	Quantities. Tons.	Value. £ s. d.
Coal	134,610 763	47,113,767 0 0
Iron ore	16,692,802	6,746,668 8 11
Tin ore	14,142	572,763 0 0
Copper ore	73,141	262,270 15 5
Lead ore	80,850	1,123 9.2 0 0
Zinc ore	24,405	86,151 1 4
Iron pyrites	43.948	28 225 14 7
Arsenic	4,809	30.420 12 8
Manganese	3,038	7,958 1 6
Bismuth	8 cwts.	15 4 0
Cobalt and nickel	27	241 16 11
Gold ore	—	18 4 6

Minerals.	Quantities.	Value.
Silver ore ... ...Tons	142 ...	£ 927 0 0
Uranium ore	2 cwts. ...	11 15 3
Wolfram	15 ...	150 0 0
Fluor spar	220 ...	36 12 0
Ochre and umber	5,074 ...	4,438 13 9
Clays—Porcelain, potters', and fire clays	2,961,155 ...	592,231 0 0
Salt	2,735,001 ...	1,504 250 0 0
Barytes	21,056 ...	28 948 1 7
Calc spar	2,353 ...	625 0 0
Coprolites, &c....	69 006 ...	200 000 0 0
Shales, for oil	123 558 ...	61 779 0 0
Gypsum	73,908 ...	22,172 8 0
Sundry minerals	— ...	10.000 0 0

Total value of minerals produced in 1877...£58.398.071 10 5

PRODUCTION OF COAL.—From the summary of the coal produce of the United Kingdom, computed from returns received from the Mining Record Office for 1877, the output of 3781 collieries amounted to 134,610,763 tons, compared with 133.344.766 tons in the previous year, when 4002 collieries were in operation. We will in our next issue enter fully into this important industry, considering in detail the production and distribution by railway and canal of each coal-producing area, the exports to foreign countries and coastwise, and quantities employed in our mercantile marine in 1877 and previous years.

In the volume of Mineral Statistics for 1877, now before us, the appendix as usual contains very complete lists of our metalliferous, iron and coal mines, clayworks, and metal extraction works brought up to date. We may add, in conclusion, that the Keeper of Mining Records, Mr. R. Hunt, F.R.S., has, as in previous years in the preparation of this important statistical record of our mining and metallurgical progress, had the able assistance of the Assistant Keepers, Mr. Richard Meade and Mr. J. B. Jordan.

Original Correspondence.

THE COLLIERY EXPLOSION IN SOUTH WALES.

Following closely upon the lamentable railway accident at Sittingbourne, and the still more dreadful catastrophe in the Thames, resulting in the sacrifice of nearly 600 lives, the dreadful explosion—the largest which has ever occurred in South Wales—at the Ebbw Vale Company's Prince of Wales pit at Abercarne, from which, at the lowest estimate yet obtainable, 260 deaths have resulted, is rendered even more startling than many of the great colliery accidents which have from time to time cast a gloom over those connected with mining. As is the case in all such calamities, it is at first extremely difficult to obtain exact details, either as to the precise cause of the explosion or the number of sufferers, but it seems that 373 men are known to have taken lamps from the lamp-room at the beginning of the shift, and that there were some men and boys in the pit who had no lamps. Of these only 82 were recovered alive, and some died shortly after being brought to surface Until the explosion occurred the colliery, which is one of the largest, was regarded as being also one of the best-worked in the district, and a good quality of steam coal was being turned out at the rate of more than 1000 tons per day, giving employment to more than 1000 colliers. The shift, whose labours commenced at 6 o'clock on Wednesday morning, would in the ordinary course of affairs have come to bank at 2 o'clock, but within a few minutes of noon the explosion occurred which placed nearly three-fourths of those underground beyond the reach of human aid, for the severity of the blow was such that the shafts had been rendered temporarily impassable.

The willingness to undertake any risk in the hope of saving life invariably undertaken by the colliers and the colliery officials of the neighbourhood was instantly displayed at Abercarne, and hence the saving of the 80 lives already mentioned. The sound of a colliery explosion is so unmistakable when it has once been heard that the entire village population was at once in excitement; information of the calamity spread rapidly throughout the district, and every possible effort was at once made to communicate with the bottom of the shaft, and to ascertain the extent of the disaster. In a very short time messengers and overmen from other collieries in the neighbourhood hurried to the spot, with colliers and others who understood the nature of the underground workings, together with many medical men. Mr. Pond, the general manager of the pit; Mr. Cadman, Her Majesty's Chief Inspector of Collieries; and Mr Donald Bain, deputy-Inspector for the district, were quickly on the spot, and rendered every possible assistance. As soon as the first exploring party descended the pit it was discovered that the colliery was on fire, and the managers were thereupon most reluctantly compelled to shut off the air in order to extinguish the flames. The explorers on reaching the bottom of the shaft found the air very impure, but by persistent efforts the party managed to explore the pit for about 200 yards, when they reached the stables. Here they discovered that 14 horses lay dead, thus giving little hope of rescuing any of the colliers. The after-damp prevented any further investigation, and they were compelled to retire, the air being shut off, and the gas filling the pit. The Government Inspector was among the first to descend the pit, but such was the utter chaos and confusion that some time elapsed before anything could be done in the way of recovering the bodies. The wreck was something terrible; 60 horses have succumbed to the explosion. The 82 men who were rescued were about 400 yards from the bottom of the shaft. The others were scattered throughout the workings, which extend to several miles each way, so that there is little hope of any more being recovered.

Abercarne, the scene of the disaster, is about midway between Newport and Ebbw Vale, and in the midst of the village which takes its name from it. The present manager, Mr. Pond, is universally regarded as a competent man, and to this is attributed the previous freedom from calamities. Whether the accident is due to the new ventilating apparatus cannot yet be ascertained, but it appears that the shaft is only of moderate depth—about 300 yards—that the pit was worked exclusively with safety-lamps, and that Mr. J. Higson (of Messrs. J. and P. Higson, of Manchester), the superintending engineer, has paid monthly visits of inspection to the pits, his last visit to the pit which has been exploded being only a week or ten days ago. It is said that one of the most recent improvements in connection with the pit has been the construction of new ventilating apparatus. Originally the Ebbw Vale Collieries were in the hands of what may be described as a London company, but during the period in which Mr. Alderman Curtis, of Manchester, held the office of chairman, appointments to the directorate were given from Manchester, and that city and the neighbourhood gave a considerable increase to the number of shareholders. For the last three years Mr. J. F. Rowbotham, a Manchester gentleman, has acted as resident general manager, and his previous experience, as well as the part he has really taken in the management, will no doubt be enquired into. The workings were known to be very gaseous, and it was the knowledge of this fact that led to the opening up of the new shaft, and the subsequent adaptation of the old one as a ventilating shaft.

It cannot be doubted that these explosions have become far too numerous, and that something must now be done to lessen their frequency and extent. The Lundhill Explosion, which resulted in the death of 189; the Oaks, 365; the Swaith's Main, 140; the Rhondda, 178; the Blantyre, 200; have caused many to forget the fatal Hartley accident of 1862, when the breakage of a piece of machinery choked the shaft and entombed 204 workmen. The cause of this entombment was the then common practice of working collieries through one shaft only, so that as there was but one exit a comparatively trifling accident sufficed to bury alive everyone who happened to be underground at the time. The obvious remedy for this state of things was to prohibit the working of any mine unless two distinct means of egress were provided. As many small collieries contained insufficient coal to justify, in a commercial sense, the sinking of a second shaft, the proposal to make the use of two shafts compulsory was widely condemned as impracticable, but we met the difficulty by declaring that where this was the case the proposed Act could be complied with by opening a communication with the neighbouring colliery. This proposition was condemned as still more objectionable, and the idea was even ridiculed by some practical engineers, and it was pointed out that the suggestion could not be adopted, as the leases would seldom permit those working the collieries to adopt it. But the agitation was continued, the prohibition of single shaft working became part of the law of the land, and the supposed insuperable difficulty was overcome by a clause of a few lines over-riding any obstructive condition which leases might contain, and protecting lessees who broke through the required coal barrier to secure two outlets. The collieries of neighbouring lessees have since been in many cases connected to comply with the Act, and no inconvenience whatever has arisen, whilst greatly increased safety has been easily and cheaply secured.

And for a large number of collieries now liable to these fearful explosions there is an equally simple remedy, although that accidents in collieries can be entirely prevented is scarcely to be expected. A Parliamentary enactment should prohibit the working of any colliery without an efficient shaft to the rise, well open to all goaves, and kept constantly in use. This idea may be again condemned, and the writer stigmatised as ignorant of his profession, but his views will ultimately have to be adopted. One of the most energetic in suggesting the working of collieries to the dip only was Mr. Joseph, whose paper read before the South Wales Institute of Engineers was published, with illustrations, in the Journal several years since. Taken in the abstract, working to the dip has many practical disadvantages. Every tram of coal has to be hauled up to the winding-shaft instead of being run down, and the drainage is also away from the shaft instead of towards it. Neither Mr. Joseph, however, nor anyone else, has ever proposed to prohibit the use of a shaft on the dip side of a property, but merely that the workings should always be carried on from the rise to the dip, and not from the dip to the rise. And since fire-damp as certainly rises and escapes where it has the opportunity to do so, as water flows to a lower level, it follows that a shaft to the rise would keep the pit and goaves free from gas, just as a good sump on the dip, carefully cleared with an ample pumping engine, will keep it free from water. In opening a new colliery there would be no difficulty in providing an upcast on the rise and a downcast on the dip side of the workings, and if the first were at the east end of the north side of the property, the other would be at the west end of the south side, and so with properties in other positions.

The shafts would be connected as soon as practicable by drivings along the north and west sides (assuming the north to be the rise side), and then the workings would all be carried on from the rise downward in such a way that all goaves would be to the rise of the working places, and between such working places and the upcast shaft. As the downcast shaft would be the winding and pumping shaft, the trams could be run from the faces to the pit bottom with the same facility as in rise working, but there would be the great advantage that the men would always get the first instead, as they often do at present, the last of the air.

Nor is this all, for from the very system of working the goaves would always be kept ventilated with the utmost facility, as no large body of gas would ever accumulate in them; and, even assuming the ignition of freshly liberated gas, the worst effect would be to burn a man or two, instead of slaughtering a couple of hundred. In the case of old mines there would, of course, be greater difficulty in putting the system into practice, but still the cost of adopting it would be small as compared with the loss, regarded from a merely commercial point of view, attending a single explosion such as that which has just produced such irreparable misery at Abercarne.

DYNAMITE AND GUNCOTTON ACCIDENTS.

SIR,—Although it has frequently been pointed out in the *Mining Journal* that nitroglycerine compounds—dynamite, lithofracteur, and such like—cannot from their very nature be rendered stable, so that such explosives, even if safe at the moment of delivery, are liable to, and actually do, become decomposed and dangerous by storage, the agitation is still kept up against the Explosive Acts, and some of the most absurd calculations are made by those interested in endeavouring to secure their repeal; and guncotton seems to be quite as objectionable as an industrial explosive, owing to the poisonous character of the fumes remaining after it has been exploded. The necessity for the strict enforcement of the Explosive Acts is shown by two reports just printed for presentation to Parliament, the first upon a serious guncotton accident at the Halkyn District Mines Drainage Works; the other upon two fatal dynamite explosions at the Yarnside Mines, Parkhouse, Barrow-in-Furness. All of these were, no doubt, due to some extent to carelessness, but the character of them show that in practical use both guncotton and nitroglycerine compounds require vastly greater care than gunpowder; that neither are so reliable as gunpowder, and that special legislation is absolutely necessary—a fact recognised when the Explosive Acts were passed—to prevent the sacrifice of life by their use. Dynamite will do much more work than a corresponding weight of gunpowder, and with the restrictions at present placed upon its carriage and storage it would be unreasonable to prohibit its use, but it is so deadly and unstable an explosive that an Act should be passed rendering it compulsory to employ an officer—the underground captain or foreman might be named—specially licensed by the Home Secretary as represented by the Inspectors of Explosives to fire the shots. Where necessary several explosive officers might be appointed in the same mine, so as not to interfere with the rapidity of the work.

The reports I refer to are both made to the Home Secretary by Major A. Ford, R.A., Government Inspector of Explosives. The first refers to an enquiry into the patent safety guncotton accident at Halkyn in April last, whereby one man lost his life and eleven others were injured. The report first states that Halkyn Mountain is a hilly tract in Flintshire, extending some four or five miles in a north-westerly direction, and containing valuable lead mines, which, however, it has been hitherto very difficult to work on account of the influx of water. Owing to their great depth it has been found impracticable to pump the water up to the surface, and an attempt has been made to drain it off by constructing an outlet through the mountain side. A tunnel was commenced for that purpose so long since as 1818, but the work proceeded slowly; in 1876 it was so far completed that a communication with the Halkyn Deep Level Mine had been effected—about a mile and a half in length. In that year a company called the Halkyn District Mines Drainage Company, having taken the matter up, entered into a contract with the Diamond Rock Boring Company (Limited) who undertook to excavate 1280 yards. A considerable time was expended in enlarging the old mine shaft and in making other preparations, but ultimately the actual work of excavation was commenced on Feb. 19, 1878. From the account given by Major Ford of the method of working and mode of ventilating the tunnel it is evident that the air was excellent when not made poisonous by the patent safety cotton smoke.

At an unfortunate moment—April 1—Mr. Campbell, the superintendent of the boring operations, was induced by Mr Williams, an agent of the Patent Safety (?) Guncotton Company, at Stowmarket, to permit a trial of their explosive, and an experienced old Welsh miner—Morris Richards—charged some holes with wet cotton and exploded it, but the trial was a failure—the cotton merely blew out without disturbing the rock, which is limestone. Mr. Williams then asked permission to use dry cotton, and it was arranged to try it at 5 o'clock the following day. Morris Richards who had had twelve years experience as demonstrator to the Patent Safety Company, was there as before, and fired the dry cotton, with the same failure as the wet. The four holes were then blown out with dynamite, the fumes from which had cleared away before the men returned to the face. Morris Richards was then permitted to try four other holes. These were in due time prepared and exploded. On the way to examine the work done Mr. Campbell remarked to Mr. Thornton that the fumes were much "sharper" than dynamite smoke; the men also considered them stronger. Morris Richards, who proceeded to charge another round of four holes, states that he then found the smoke and smell bad, but he thought that more dust and heat came from the limestone than from a granite, to which he was more accustomed, and attributed the bad smell to the dynamite. With regard to this it may be remarked that the men who were working below had been in the habit of using dynamite, and had suffered no ill effects therefrom; Richards, on the other hand, had been used to the fumes of guncotton. As to the smoke, that he said came from the fuze, a long piece of which was used with each charge, and he thought the men did not allow enough time for the fumes to clear away before going to the face. When the four holes were again charged and the snuffs lighted they all retired as before to the ladder-way, and the discharge took place. Mr. Campbell at once prepared to return to the face. Morris Richards however objected to go up so soon, saying that the smoke was too bad. He could not speak English, and caught hold of the foreman's coat, he says, to induce him to wait a little. As Richards would not come Mr. Campbell took from him the primers for the next round, and Richards then gave the cartridges to one of the men. Mr. Thornton and Pacey had in the meantime started, and Mr. Campbell followed; the rest of the men, however, stopped behind for a short time.

Proceeding towards the face Mr. Campbell, Mr. Thornton, and Pacey had got about 100 yards, when they all remarked that they felt queer from the guncotton fumes, but they managed to walk on to the mouth of the pipe, near to which they placed their faces, having removed the piece of timber; that after staying there about half a minute he said to the others "I never can stand it; we had better go back and stop the men from coming up:" and they then started to return, and when about 99 yards from the face met some of the men, whom they told to go back. Mr Campbell then fell down insensible. Pacey, in the meantime, had become insensible when about 40 yards only from the face; Mr. Thornton passed him, but fell down shortly afterwards. One of the men then went to the bottom of the shaft for assistance. Meanwhile the poisonous fumes were travelling slowly along, and ultimately the whole of the seven miners, and Morris Richards, as also the signalman at the bottom of the shaft, and two of the four men who were the first to do down to render assistance, were sooner or later made insensible thereby. There were thus altogether 14 rendered insensible. All however, ultimately recovered, with the exception of Mr. Thornton, who, it would seem, never breathed after he first fell down. I think, says Major Ford, that the Patent Safety Guncotton Company ought not to have left the carrying out of experiments to which a considerable risk was attached in the hands of a miner (however skilful) who could not make himself understood by, and who could never have sufficient influence over, those in charge of the work; and that they should at any rate have sent a responsible agent down into the tunnel with him. But, it will be asked, why would not Mr Campbell and Pacey, the foreman, listen to Richards; why were they so anxious to go up at once to the face, instead of waiting till the fumes had in some measure passed off? And in the answer which must be given to this question the real responsibility of the Patent Safety Guncotton Company in the matter appears to me to lie. I have already referred to the pamphlet issued by the company setting forth the merits of their guncotton. In it I find the following stated as one of the advantages of guncotton over other explosives:—4. In close workings the absence of smoke or non-noxious gases renders the use of guncotton doubly valuable, for whilst the smoke from gunpowder is a most deleterious ingredient to the air of mines, guncotton, owing to its freedom from smoke, bears the highest sanitary character. Dr. Angus Smith, F.R.S., in his report to Parliament, says—"In every trial in which the effect on the senses or the breathing, and, as far as we can judge, on health, was considered, guncotton has come off with the highest character. I feel much confidence in speaking thus highly in its favour." This seems to be a somewhat garbled representation of Dr. Angus Smith's report, for Major Ford states in a note that this is extracted from a report on the "Air in Mines," by Dr. Angus Smith, to the Commissioners appointed in 1862 to enquire into the condition of mines with reference to the health and safety of persons employed therein. It appears from his report, and from the account of some experiments made under his superintendence, that Dr. Angus Smith is referring mainly to the absence of nitrous fumes in the gases given off, and not to the absence of carbonic oxide, of which he shows by a table there will be 29 per cent. His experiments were made with very small charges, the largest fired among those recorded at Dolcoath Mine having been 0·167 lb. only.

In conclusion, Major Ford says that it is quite true that there is little or no smoke from the explosion of guncotton; but an invisible noxious gas—carbonic oxide—is evolved therefrom; and as this gas does not extinguish a light, as carbonic acid does, it would very probably not be perceived in time to prevent the fatal results which it produces. For issuing a pamphlet containing such an incorrect and misleading statement the Patent Safety Guncotton Company appear to me to have exposed themselves to severe censure, and to have incurred grave moral, if not legal, responsibility in regard to this accident. I confess that when I commenced this enquiry I was not prepared to find that such a dangerously misleading and untrue statement with regard to the character of the fumes of guncotton had been put into circulation generally throughout the country by the manufacturers. This statement has hitherto entirely escaped the notice of this department, but now it has been brought to light by this accident, of which, indeed, in my opinion, it was the proximate cause, I take this opportunity of protesting against its being allowed to remain in circulation, and I consider that such steps as may be considered advisable should be at once taken to procure its immediate and unqualified withdrawal.

As to the dynamite accidents, they appear to have been in a great measure due to the falsehood still published by Nobel's Explosive Company that dynamite is "unaffected by damp." Major Ford states that the dynamite used was No. 1, which consists of 75 per cent. of nitro-glycerine, absorbed by 25 per cent. of a silecious earth or sand, known as kieselguhr. The sand is very porous, and absorbs the nitro-glycerine in the same manner as a sponge absorbs water, but the nitro-glycerine not being vapourised at ordinary temperatures does not dry out of the kiesulguhr in the same way as water dries out of a sponge. In its normal condition dynamite is a red, homogeneous, plastic mass, but when the temperature falls below about 40° Fahr. the nitro-glycerine contained in the kieselguhr freezes, and a cartridge (in which form it is supplied for blasting) is then with difficulty broken in two in the hands.

Nitro-glycerine is a colourless oil much heavier than water, and when a dynamite cartridge is placed into a tumbler of water the nitro-glycerine it contains gradually leaves the kieselguhr and sinks to the bottom of the tumbler. It some cases the kieselguhr falls to pieces at the same time. Liquid nitro-glycerine is a very sensitive explosive, and is only licensed to be manufactured in England for immediate conversion into dynamite. In consequence of accidents it was prohibited from being kept by the Nitro-glycerine Act of 1869, and this prohibition is continued under the Explosives Act; even under very stringent regulations it would not be safe either to be handled or to be transported, and it is especially sensitive to contact with metal. And since the nitro-glycerine is readily washed out by water, and the solid comparatively safe explosive is thereby without difficulty reconverted into a liquid of so dangerous a character, it is clear that unless the explosive is to be forthwith fired, all contact of dynamite with water should be most rigidly guarded against. And if it is necessary to insist upon this even where the action of water upon dynamite is well known, it is obviously much more so in the case of ordinary miners, by far the greatest part, I might say almost the whole, of whom are absolutely ignorant of this property, because persons who are thus ignorant are liable, by bringing dynamite into contact with water, not only to call into existence an explosive which, as before stated, is exceptionally sensitive, but being unaware that they are dealing with anything more dangerous than dynamite, they are without any inducement to make further provision for the greater risks attendant upon its use than would be generally considered requisite in the use of dynamite.

Such being the case, it would be naturally supposed that the Nobel's Explosives Company, who are the only manufacturers of

dynamite in the United Kingdom, would take the best possible steps to make known this action of water upon their explosive and take the best possible steps to make known this action of water upon their explosive and to prevent the possibility of an accident, as far as lies in their power, resulting from ignorance of its properties. But they pursue exactly the opposite course. Week after week an advertisement still appears in at least one of the mining journals that dynamite is "unaffected by damp," in the face of accidents which have been traced to this cause, and of an emphatic protest in the annual report for 1877 against such an untrue and dangerously misleading statement. I have met with many instances in which the nitro-glycerine has been found to be exuding from dynamite in damp magazines; and although this has been prevented by the enforced adoption of water-proof packages so long as the dynamite remains in such packages, yet when it is exposed each drop of water which condenses on its surface runs in, and *pro tanto* nitro-glycerine runs out of the cartridge.

As to the blame to be attached, Major Ford says that the sinkers seem to him to have been in no wise reckless or even careless on either occasion, and he was unable to discover any neglect on the part of the Yarlside Mining Company, their employers, tending to bring about either accident. On the contrary, they appeared most anxious to adopt every suggestion made to them, even at considerable cost, to prevent a recurrence. They, as well as their men, appeared to know nothing whatever of the peculiar properties of dynamite when brought in contact with water. He does not think that blame in any degree is to be attributed either to the Yarlside Mining Company or to the men working in the pits where the accidents occurred. But he does consider that the Nobel's Explosives Company are very much to blame for sending forth to the world an explosive which has hidden dangers attendant upon its use, without a full explanation of those dangers, and how they may be—as, indeed, they can be easily—avoided; and that they incur a grave moral, if not a legal, responsibility in respect of all similar accidents, not only for this neglect, but also in a much higher degree, for issuing a public notice that dynamite is "unaffected by damp," a statement which is in itself untrue, and in the absence of qualifying words leads to the conclusion that the explosive is also unaffected by water, and thus to the neglect of precautions the adoption of which would prevent the recurrence of accidents from this cause.—*Sept.* 9. H.

DYNAMITE—COTTON POWDER—GUNPOWDER.

SIR,—In reading the account of dynamite experiments at Mickleton-in-Teesdale in the Journal of Aug. 31, I was rather amused at the manner in which the writer of the article departs from the business in hand to give an account of the great doings of dynamite all over the country. It appears more like a first-class advertisement. Now, I think it is pretty well known what are the relative merits of dynamite, cotton powder, and gunpowder, and I can tell the writer that if cotton powder failed in the case he quoted it was not the fault of the material, but the want of knowledge how to handle it, and if some of the divers who have had experience in it and who prefer it to dynamite had been there, I can assure him the results would have been very different. I will admit that it is requisite to keep the primer of cotton powder dry, and, in fact, the drier the better, but according to all official reports the same may be said of dynamite, and it is senseless to let any explosive get wet if it can be kept dry.

I do not propose to enter into any argument respecting the strength of cotton powder *versus* dynamite; the fact that it is taking the place of dynamite in the principal establishments in the kingdom is the best proof of its strength and safety. As regards its use for submarine work when properly made into torpedoes of a recent pattern, it is found to do its work in a manner second to no other explosive, and it is equally capable of being fired under water by electricity, or by ordinary waterproof fuse, according as the operator may desire. As an explosive it is infinitely safer than any of the nitroglycerine preparations, which freeze at a temperature of 43° Fahr., and require the dangerous process of thawing before being fit to use. The nitroglycerine is also liable to exude when exposed to a moderately high temperature, or to moisture, which are both fruitful sources of fatal accidents. Cotton powder is exempt from these dangerous characteristics, and this alone, irrespective of other points in its favour, is rapidly gaining for it deserved popularity.
Sept. 2. FAIR.

CHEMICAL ANALYSIS OF MINERALS AND METALS.

SIR,—In your valuable Journal of to-day there appears a notice entitled "Chemical Analysis of Minerals and Metals," in the course of which some extracts are taken from a lecture delivered by Mr. Crowther, the assistant curator of the Leeds Museum. Some of these remarks are certainly open to question in regard to their chemical bearings, and to these points I beg to call your attention. First, as to the methods employed for distinguishing between the two oxides of iron present in iron ores. Any person unacquainted with the subject would suppose from reading the article in question that small pieces of the various ores were taken and placed in separate test tubes, and the ferricyanide or sulphocyanide of potassium added thereto, the result being a blue or red colour, as the case might be. Now, no such result would take place unless the ironstone was first finely powdered and treated with boiling hydrochloric acid, in order to dissolve out and render soluble the iron present; under these circumstances the reactions mentioned would then take place. Also, it is stated that the ore known as carbonate of iron (spathic ore) contains iron in both states of oxidation, when it is well known that it only contains the protoxide of iron, the composition of the body when pure being protoxide of iron, 62·07; carbonic acid, 37·93=100.

If this statement had been made respecting the Swedish ores it would have been quite correct, as many of these ores do contain both protoxide and peroxide of iron, and give rise to a body termed the magnetic oxide, which is magnetic—and, in fact, is the ordinary "loadstone." This ore contains when pure 72·41 per cent. metallic iron, which is the highest percentage possible for any iron ore to contain.

Again, in the paragraph on the detection of arsenic, it is stated that "hydrogen is prepared from pure zinc," &c., and "is then put into a generating apparatus." Now, as zinc contains no hydrogen it is difficult to understand how it is obtained; also the idea of "putting" hydrogen into a generating apparatus, like so much sand or sugar, is absurd, the method employed, as a rule, being by taking the suspected body (in solution), and adding it through a small funnel into a flask in which hydrogen is generated from zinc and sulphuric acid, the "nascent" gas (hydrogen) then reduces the arsenical compound, and produces the arsenietted hydrogen, which burns in the manner described.

I may also be allowed to point out that there are many printer's errors—at least I cannot understand any person even with a slight knowledge of chemistry using such terms as "potassic ferriejande," "potassic "iodine" "de-sodic," "triferrous deferric docleana cyanide" for potassic ferricyanide, and iodide "di-sodic," triferrous, di-ferric, dodecacyanide (or much shorter, "Turnbull's blue"). Again, in speaking of the reaction between mercuric chloride and "plumbic acid," I think it is far more probable that potassic iodide and plumbic acetate are meant; certainly not plumbic acid, a body which if it exists at all has never been isolated from its combinations. Also, and lastly, in speaking of the addition of ammonia to a salt of copper it is stated that a "most magnificent blue phosphate is produced." The above must be a mistake, either on the part of the author or else the printer, who has put "phosphate" for "precipitate." Yet this would not be quite correct, as the precipitate produced is not blue, but when an excess of ammonia is added the precipitate re-dissolves, and gives a beautiful blue-coloured liquid.

I do not make the above remarks in any dissatisfied or grumbling spirit, but simply in order to state the facts of the case; yet at the same time I think gentlemen who write for such high class papers as yours should take the greatest care before publishing their remarks to see that what they state is correct, and certainly not to speak and use the terms of highly exact and difficult science in such a loose manner as in the paper before us J. C. BUTTERFIELD.
Laboratory and Assay Offices, Queen Victoria-street, Sept. 7.

PROHIBITION OF BLASTING IN COLLIERIES.

SIR,—I have seen it frequently stated in the *Mining Journal* that the reason why it is impracticable to prohibit the use of explosives in mines is because it is not so economic to get the coal down with wedges. This, I think, has been admitted to arise from the cost of the apparatus for wedging down the coal after it has been holed. Now, Mr. Jonathan Harrison of this place, who is a good mechanic, has made an improvement which will give a cheap yet equally effective machine. It is the practice after "holeing" the coal to break it down, or detach it from the main body of the coal by wedges, and it is the function of the wedge to detach or break down as much as possible of this coal. This improved wedging apparatus will break down the coal in larger quantities than the common wedge in ordinary use, and it is as efficient in operation as other wedging apparatus of more complicated design and expensive construction. It consists, firstly, of a strong parallel tube, which is divided into two equal parts in the direction of its length, the said tube (in two parts) has its internal diameter parallel, but larger at its front end for (say) one-fifth or one-sixth of its length, and smaller in diameter for (say) the remaining four-fifths or five-sixths of its length, or thereabouts; but he does not now fix any proportions for the lengths of the large and small internal diameters of any wedge tube. The front end of the tube is that which first enters the hole in the coal, and the back end is that nearest the operator. The second part of the improvement consists of a wedge of a peculiar and novel description, which will be driven into the tube and expand each half of it, and so exert a great pressure on the coal. The said wedge is a combination of the ordinary flat wedge and the ordinary round taper plug wedge, the round portion being at the front end and the flat portion at the back, and that portion of it between the round and flat parts being flat with the half of a round taper plug on each side, thereby forming a compound wedge, the round portion of which will act at or towards the front end of the tube, the half-round and flat parts (combined) will act at or about the centre, and the flat portion will act at or towards the back end of the tube, the flat portion of the wedge acting on the flat portions of the sides, so to speak, of each half of the tube.

The tube (in two parts) and the compound wedge may be made of steel or other suitable material, and may either be used as first formed, or may be turned, bored, planed, or otherwise machined or fitted. When the tube and wedge are placed in position, and the wedge is actuated by blows from a hammer, or otherwise, the coal will be broken down at or near the front end of the wedge, as well as at the back end thereof. If the combined plug and wedge does not break down the coal in the first instance, other wedges can be used at the back of it, as in the ordinary way of wedging down coal or other material.—*Coalville, Sept.* 7. J. C. B.

LONDON COAL SUPPLY.

SIR,—Boston is destined to become the chief coal port of Great Britain, and to possess preponderating advantages in the miscellaneous or general import and export trade over Hull, Grimsby, Goole, or Lynn. The circumstances which raised Boston from its extreme insignificance, in a commercial point of view, at the date of the Norman Conquest to its high importance as a shipping port and place of business in 1205, increasing its trade until it paid twice as much duty upon the great articles of export of the period 1281 as London did, and even more than a third of the entire duty paid upon those articles by the whole of the kingdom during the decennial period 1279–1288, sustaining the town as a great, wealthy, and prosperous commercial emporium until nearly the end of the fourteenth century, was its geographical position, river, haven, and inland water communication, large vessels, as proved by reliable data, and by ribs, anchors, &c., dug up, having constantly loaded and discharged their cargoes at Lincoln. With the advent of the Yorkshire, Derbyshire, and Nottinghamshire coal traffic being diverted from its present unnatural and costly route to the Metropolis *via* Boston, and seaborne, at a saving of upwards of 5s a ton over rail transit and attendant expenses, and of 4s a ton over Tyne shipment, constituting Boston Deeps, in their present state, and without entailing any outlay of whatever nature on the Boston Harbour trustees, what the Durham coal field has made the Tyne Dock at South Shields, and the Northumberland coal field the Northumbeland Dock at North Shields—the shipping berths of the Tyne. Exuberant funds will be acquired by the Harbour trustees to remove, for the benefit of the steam traffic in particular (by no means necessary for the proposed shipment of coal), by dredging the Boston bar, and maintain a depth of water sufficient for even the largest war ships to enter and depart at all states of the tide and weather. The increased depth at Tynemouth bar and in the Tyne has been accomplished by dredging in the face of an immense quantity of sand washed into the entrance, with north-east and south east gales, freshets silting up the navigation. Boston Deeps, apart from the Witham, present a greater distance or area than the Tyne, and there is nothing to prevent a permanent depth of upwards of 30 ft. at low water being maintained at Boston bar. Within a comparatively recent date pedestrians traversed Tynemouth bar at low water where, through dredging, 30 ft. at low water now exist according to the latest official map.

The most eminent and practical coal transit engineer of Great Britain — Mr. Thomas Elliot Harrison — engineer-in-chief of the North-Eastern Railway, and past president of the Institute of Civil Engineers, conscious of the futility of grasping at an ephemeral revenue from conveying the coal from the pre-cited coal fields over the extent of their system from north of the Tyne to the junction with the Great Northern, so very different from the administrative capacity of the Great Northern, originated, planned, and completed the Tyne Dock at an immense cost and ultimate benefit to the railway company, from which by far the largest tonnage of coal is shipped to the Thames. He carried into practice what Mr. Moon, Mr. Allport, and Mr. Oakley have unequivocally and publicly admitted in theory. The two former systems have it not in their power to carry their convictions into practice, but Mr. Oakley, in the possession of Boston, has no excuse for not taking advantage of the practical and long-tested experience of the two greatest authorities in the transit of coal to the Metropolis—Mr. Thomas Elliot Harrison and Mr. James Allport—whose lengthened prominent connection with the Tyne coal traffic constitutes him a standard authority. The Great Northern's future is Boston.

The history of Mr. W. Elstob in 1793 of the Bedford Level; the reports of Mr. William Chapman in 1800; and of Mr. John (later Sir John) Rennie of October 6, 1800, and of June 29, 1822; of Mr. Thos. Telford of March 22, 1823; of Sir John Rennie of March 22, 1823; of Mr. John (later Sir John) Hawkshaw of December 23, 1864; of Mr. W. H. Wheeler of October 11, 1870; of the River Committee of the Boston Harbour Trust of May 1, 1876, bear more or less upon the diminished scouring power caused by the great sluice in preventing the free flux and reflux of the tide beyond the town of Boston. The exhaustive recent work—the Fenland, Past and Present—by Messieurs Miller and Skertchly deserves particular mention. Without commenting in the most distant degree upon pre-cited valuable data I confine myself to the removal of the Boston bar, and maintaining a depth of water of 30 feet at low water by dredging. Having been Russian Consul during upwards of 25 years for North and South Shields and district since the establishment of a consular port to its abolition, within the precincts of which a greater tonnage is shipped than from any other part of the globe, I deem it sufficient to state that the detention to screw colliers on the Tyne is very great, restricting the number of voyages in the year, and as a natural consequence enhancing the freight to the metropolitan consumer. The Bywell Castle, which collided with the Princess Alice off Woolwich on Tuesday, September 3, was subjected to a forced tidal delay on her arrival at Shields on the 7th of ten hours before being able to enter the dock to load—*vide* Shields Daily Gazette, September 9.

The steamship Vauxhall, built this year with the special object of conveying coal from the Tyne to the London Gasworks, Nine Elms, has been detained 48 hours in the Tyne in loading, which the proposed system of transit from Boston Deeps will obviate. A vessel arriving at Hull, Grimsby, Goole, and Lynn, at all of which ports docks exist, is subjected to very great detention, whilst Boston Deeps—accessible at all states of tide and weather—presents a vast deep water sheltered estuary 18 miles in length, with an average permanent depth at low water of 30 ft., accessible at all states of tide and weather. Boston Deeps will constitute the largest and most secure war port in England, and a port of refuge to which the Tyne cannot be compared; as it is, notorious, numerous, and awful wrecks take place inside the piers in an unfinished state, and which in all probability will remain so. The precited coal fields the Great Northern Railway Company, and the town and district of Boston, will derive an incalculable benefit in co-operating with me in carrying out what is now submitted to their serious consideration. WILLIAM JOSEPH THOMPSON.
6, *Fitzwilliam-road, Clapham, London, Sept.* 12.

THE ENGLISH IRON TRADE—BELGIAN COMPETITION.

SIR,—The writer of your articles on the Metal Market has much to say about the Belgians monopolising our Indian and China markets with their common bar-iron to the exclusion of English iron from those markets, consequent on the lower prices at which they accept orders; but he is not, perhaps, aware how these men cheat the English buyers in weight. I give you below the actual weights of six lots of this iron shipped to Calcutta by my firm since December last, which were converted into English weights on the basis of 1015 kilos. per ton, and opposite each I give the actual loss of weight on each parcel, arrived at by weighment as received by the consignees. The policy of these cheats appears to be—"We will quote very low prices to secure Englishmen's orders, and when we get them we will give them short weights, and thereby recoup ourselves some 3s. or 4s. per ton, which they will not discover in England, and if their consignees abroad do so and make any claims, we will not listen to them, but simply say, 'The weight of the parcels of iron you refer to correspond with the entries in our books, and we cannot be responsible after the iron left our works.'" The manufacturers of common English iron cannot possibly compete with these Belgians whilst their dishonest practices are allowed to continue unexposed.—*London, Sept.* 10. METAL.

	Tons	c.	q.	lbs.	Short weight when landed. Tons	c.	q.	lbs.
Invoice No. 1	25	8	2	0	0	7	0	2
" 2	30	12	0	27	1	10	1	10
" 3	25	5	3	23	0	7	0	1
" 4	54	18	3	9	0	15	2	2
" 5	56	3	2	16	2	9	1	3
" 6	15	15	3	10	0	19	0	0
Total	208	5	0	1	6	8	0	18

RICHMOND MINING COMPANY.

SIR,—Mr. Elliott and others have misrepresented and misquoted my letters which you published on the 10th and 24th ult. The purport of my letters was not to attack the mine, but to show shareholders that their property was not under the direct control of the London directors as they believed. The real text of my letters was the Editorial statements of the Eureka Sentinel of June 27, which have never been contradicted. Those statements had a dishonest character, which should have been repudiated by the management at Eureka. Mr. Elliott's letters of August 17 and 31 remind me of Bret Harte's plain language from "Truthful James on the Heathen Chinee":—

"Which I wish to remark, and my language is plain,
That for ways that are dark, and for tricks that are vain,
The heathen Chinee is peculiar. Which the same I would rise to explain."

Mr. Elliott states in his letter of the 17th that a circular was issued to the shareholders in November, 1873, in which all the facts connected with the creation of the Nevada company were given, and he repeats this statement in his letter of the 31st, but says that the item of the number of shares in that company had been omitted. I stated that I could not find such a circular, and that it was never issued to the shareholders seems clear from the fact that the directors' report is dated Nov. 10, 1873, and the wording of that report shows that the shareholders were then informed for the first time of the incorporation of the present Richmond Mining Company of Nevada. I say present, because the shareholders probably do not know that there was a former Richmond Mining Company of Nevada, from which the English company purchased the property, as will be seen on reference to the Memorandum of Association of the Richmond Consolidated Mining Company (Limited), dated August 3, 1871, and signed H. W. Vallance. It would also appear that this former company was in existence in August, 1872, as, in the proceedings of the late lawsuit, Exhibit No. 1 (which is a full, true, and correct copy of the United States Government patent to the Richmond lode and mining claim) shows that "the Richmond Mining Company of Nevada did on the 30th day of August, A.D. 1872, enter and pay for said mining claim or premises."

If the English company really purchased the property in 1871 from this former company, and employed it to locate and purchase mining claims for it in 1872, why did it allow the same to be subsequently wound up, and then—in March, 1873—incorporate a fresh company? It is these dark ways and vain tricks that scare business men from a really good property.

Mr. Elliott says "the extraordinary developments in the Eureka, close up to the Richmond boundary, as well as in that mine, had created a justification for completion of the purchase." In the face of the fact that the English company could not under the laws of Nevada directly own, control, and work the mine, I cannot see that the richness of the mine itself and its neighbouring ones could justify the purchase (at such an extraordinary price) of the property, "with all its rights and privileges," for these "rights and privileges" could not be enjoyed by aliens. Mr. Elliott admits that the board had conveyed the entire and absolute control of the property to the Nevada company, and he says it is done through the agency of Mr. Probert, who is part and parcel of the English board, but did the shareholders know that the board had unanimously given up their executive powers and position to Mr. Probert, and were content to receive their fees as directors all the same? Did the shareholders know that under the bye-laws of the Nevada Company it was not Mr. Probert who exercised the "ample and absolute" power at Eureka, but Mr. Wren, the president? Mr. Wren in his evidence stated—"The property is vested in me under the bye-laws. Mr. Probert's advice is followed. I do not understand that he has any controlling authority. He is here representing the majority of the shareholders and his own business interests."

Mr. Elliott is wrong in stating that "all the other located properties were obtained direct by the Nevada Richmond." The Arctic, the Utah, the Utah No. 2, the Pacific, and the Cliffe locations were made by Messrs. Rickard, Wren, and Potts individually. The real contest between the Eureka Company and the Richmond was not because of these and other locations, but because the Richmond had crossed the "compromise line" extended.

Mr. Elliott says I quoted Mr. Benjamin, Q.C., and asked why his advice in regard to aliens had not been adopted by the board. I never mentioned Mr. Benjamin's name, and did not know that he had advised the board on this matter.

Mr. Elliott says "Mr. Benjamin's advice was not given till 1876, and then at a time when a legal contest was going on;" I am not aware that there was any contest going on in 1876. The legal difficulties commenced in January, 1877. I said that an Act of the Nevada Legislature could have been obtained during the session of 1874, and failing that in 1876.

If it were true, as I see it alleged in your editorial of the 24th ult., that this suggested Nevada Act for the benefit of aliens would conflict with the United States Federal law, it would have been discovered long ago in the States of California, Oregon, Nebraska, Texas, and Colorado, as also in the Territory of Utah. But there is no clause in the mining statutes of the United States prohibiting

aliens from purchasing and working any mining property which had previously been acquired by citizens, or those who had declared their intentions to become citizens.

It is not necessary in order to obtain mineral property under the United States statutes that a company should be incorporated, as any citizen can locate a claim, and obtain a United States patent therefor in due course. It is not necessary that a company should be incorporated to work the property, as an agent, if he be a citizen, or has declared his intention to become one, could have the same autocratic powers that the bye-laws now give to Mr. Wren—that is, if the English shareholders considered such almost unlimited powers advisable.

I certainly do profess to understand "the process by which, and the objects for which, an English company secures the protection of the laws" of the United States, and of the individual States, in carrying on its business. I have not that I am aware in my letters questioned the legal position of a trustee, whether the same be an individual or a company. I simply drew attention to the statement made by the Eureka Sentinel in reference to Mr. Probert's legal position to retain possession of the property, and to cause the English company a great deal of trouble and expense. To enable shareholders to understand the drift of this editorial mind, I quoted from the evidence given in February, 1877, by Messrs. Probert and Wren. I cannot see that even under the guise of a legal fiction trustees are justified in assuming the position occupied by Mr. Probert and Mr. Wren in this evidence, and I cannot see either that the position of the English company, secured as it was by the mortgage deed of the debenture-holders, required such evidence to be given. Of all the mining properties owned by English capitalists in the United States, I believe the Richmond is the only one which is managed and controlled in this extraordinary manner.

Sept. 11. ——— R. M. BRERETON.

THE RICHMOND MINE.

SIR,—My attention has been drawn to an anonymous communication in the Journal of Aug. 31, signed "Fair Play," making an attack on me, and the majority of those associated with me, in the late committee of enquiry. "Fair Play" might, so far as trying to hide his identity from me, have signed his name in full, while the motives which have prompted him to make this contemptible attack on me and others of the commission are equally well known to me. Since you have given space to this most false and libelous production, I beg you will in all fairness give publicity to this, my reply to it.

The only statements that appear to me to require refutation are—firstly, that I am associated with "the gentlemen who constituted the committee of enquiry, who proceeded to Nevada in alliance with men in influential positions in the company in England and the professional men they called into their assistance," in what, the writer says from what he knows, appears to be very like "a ring" from which the shareholders are, he fears, suffering. Secondly, that while in receipt of pay from the Richmond shareholders and in their employ, I applied for the position of manager in another English company, which offer being accepted, I left that company in the lurch, and returned to England to (so "Fair Play" presumes) "manipulate Richmond matters, and render an account of my stewardship." As to the first assertion, I shall content myself by stating that I neither am, nor have I ever been, associated with any of the commission, or any other persons, in any "ring" to "bull" or "bear" Richmond stock. That I have never in all my life been mixed up with any "ring" of any sort or kind, and I am never likely to be. Furthermore, I feel confident that every other member of the committee will be equally well able to contradict "Fair Play's" imputation, so far as he is concerned. Instead of my desiring to see Richmond shares depreciated, the reverse is my wish; and I may as well take this opportunity of letting it be publicly known that I am in no way responsible for Mr. Brereton's letters, and that I no sooner heard of his intention of publishing his first letter than I telegraphed to persuade him, if possible, not to, as I felt convinced that no good could result either to him or the company by his so doing.

Having disposed of the first allegation, I will now proceed to the second, the true version of which is as follows, and I shall leave it with those who read it to decide whether I have done anything of which I need be ashamed. "Fair Play" is, possibly, not aware that when I consented to be one of the commission proceeding to Nevada I and another member of it particularly stipulated that our report should be written in, and forwarded from, America; and that after that we should consider our engagement at an end, and be at liberty to go where we liked. Thus it happened that while passing through Salt Lake City, being interested in the mine to which "Fair Play" refers, I learned how valuable it was, and how the company had been robbed and plundered by its agents; and, having a considerable stake in it, I offered my services to the said company for six months, merely to superintend the sinking of a shaft, and I looked forward to being relieved within the period named by some trustworthy person, as I calculated that by that time the operations would be beyond my knowledge and power of superintending. My offer was accepted by telegram, and I was promised particulars by post; but before any arrangements or terms could be come to—and, indeed, before any were proposed by either party—it became but too evident to me that our report would have to be written in England, and not in America, and I lost no time in communicating the same to the board of the Utah company, and in withdrawing my offer of services; and the board have certainly never said a word to me beyond expressing their sincere regret that I was precluded from remaining to look after their property. It will thus be seen that I broke no covenant with either the Richmond or the Utah Company—that I neither thought of leaving the one "in the lurch," nor did I leave the other, as is asserted.

Isle of Lewis, Sept. 9. ——— F. G. STEUART.

RICHMOND MINING COMPANY.

SIR,—I have not heard anything lately respecting the action brought by the Eureka Company against this company. I shall feel obliged if any of your readers can inform me when this action is expected to come on in the American Courts. As the amount claimed by the Eureka Company is considerable, I should think it would be wise on the part of our directors to retain whatever profits they may have in hand, and not to pay any more dividends until this action is decided. More especially as there will be no returns from the mine for six weeks, the expenses, I presume, are still going on, and American judges, as experience has shown, are more favourable to American than English miners. RICHMOND SHAREHOLDER.

Sept. 11. ———

SETTING TO MINERS.

SIR,—The conversations held, or alleged to have been held, at the Wild Duck, although couched in the uncouth vernacular, exhibit good sense in relation to mining matters. I do not know the name of the writer, but he is evidently very conversant with the Camborne and Illogan district, and with the agents of the mines there, and their doings. I have not the last number of the *Mining Journal* at hand, but I read the article which purports to have emanated from the Wild Duck meeting. The statement of the case of a pare of miners, who, because they were successful in a contract owing to a favourable change in the ground, had the price cut at their next setting, notwithstanding that the ground had resumed its hardness, is a specimen of the unfair manner in which miners are treated at some mines. It appears from that statement that when the pare took a contract in the successful month at a fair price for the ground in sight it was then hard, but after some driving they were favoured by a cross-course or flookan, which enabled them to drive several fathoms speedily, whereby they earned good wages. But before their time was up the rock became very hard again. At the next setting the price fixed by the agent was not half of what it ought to be for the ground in sight, but the men had their choice to accept or refuse the bargain. The agent's reason for so limiting the price was the fact that the company did not allow men to get more than about 3*l.* per month each.

A more absurd excuse cannot be conceived. I suppose that if the same pare happened to be fortunate the second time, at the third setting they would, under similar circumstances, have the price still further reduced. But if the men take a contract when the ground is easy for driving and it becomes as hard as adamant, and the poor miners earn nothing, their case is not considered—they are not paid 3*l.* per month then. So that the miners are not equitably dealt with. They are contented to accept a fair price at all times for the ground as it stands at the time of setting, and a rule for so setting should be established and never violated. The miners should have a fair chance of getting good wages, which, as things are now ordered in some mines, they have not. I like to see fair play in all cases.—*Truro, Sept.* 10. ——— R. SYMONS.

ROCK DRILLS.

SIR,—In the Supplement to the Journal of Sept. 7 I read that Mr. Brocklehurst says "there is no machine going will work at the same pressure as Schram's machine will." I should, indeed, be glad to know that we had arrived at perfection, and accept Mr. Brocklehurst's verdict or testimony were I convinced he knew anything at all of rock drills, beyond his experience at the Magpie Mines. When a gentleman gives so unqualified a statement one cannot avoid drawing inferences which I will forbear to mention. The statement is simply untrue. Your columns have borne testimony time after time that machines have worked at half an atmosphere. Take Dubois and François, McKean's, and many others. Yet Mr. Brocklehurst says they work at Magpie at 35 to 40 lbs. pressure. So do many machines. The machines named can work at 1-5th the pressure.

The best machine, made in London, and exhibited before the Society of Engineers, worked at 40 lbs. to the inch, and made 500 blows a minute. Any novice can tell that a drill must work in proportion to the superiority of force employed over resistance. A piston or borer of the weight of 40 lbs. requires but an exposed area on the under side of 6 square inches to a pressure of ½ an atmosphere, equal to 45 lbs., and it must move. Mr. Brocklehurst's reasons are founded on inexperience. "Being so far from the air-compressor we could not cut any ground with less than 65 lbs. pressure" &c. "They can now work two machines." The old story. For facility and ease in moving about the machines were made of 2½-inch or 3-inch diameter, consequently requiring a high pressure upon a small surface exposed to the air. Let Mr. Brocklehurst tell us what is the difference in the sizes of Ingersoll and the two Schram's. Let him demonstrate the superiority by figures, the cubic inches of air at 35 to 40 lbs. per inch, and that at 65 lbs. per inch. A larger piston in the Ingersoll would doubtless work incomparably better. "Being so far removed," &c., has little to do with the question of boring—nay, greater the depth, and greater the pressure, which Mr. Brocklehurst may not have calculated on; 60 lbs. at surface may become 62 or 64 lbs. at a given depth. The test of boring machines should be in a very different strata to that of Derbyshire, where Mr. Brocklehurst says the rock is now three times as hard as formerly. Can this bear any comparison to the hard granite in Cornish mines, or the still harder tin capels and tinstone? Certainly not, so far as my limited experience goes of the limestone in the Bakewell district. The testimony to the Schram drill is untrustworthy in this instance.

Mr. Schram claims superior results for his own and Mr. Dunn's drill in some Belgian trial. I have seen the latter at work, and if it bears comparison with Schram's in merit I beg to tell them I have seen a drill of little more than half the size bore a dry hole in hard granite in the back of the 185 fm. level doubly as quick and in an incomparably harder stone than did the Dunn drill at the trial I saw. Of the other trial Mr. Schram refers to, my impression, founded on experience, is that trials at surface are utterly worthless, on which no man should buy a drill. I saw the Burleigh tried seven years ago, bore at the rate of 6 or 7 in. a minute. No machine that I have yet seen bored quicker, yet I do not know one at work in this country. Mr. Schram's machine may be Crease's or Edwards's, whose remarks in a former Journal he has ignored in his reply of last week. Mr. Schram has criticised various drills—to my mind to exalt his own. Let him prove by results their superiority, and indulge in no sham statements to the prejudice of inventors whose results are as genuine as Mr. Schram's.—*Sept.* 11. H. WADDINGTON.

TREATMENT OF COPPER AND SILVER ORES.

SIR,—As M. Dronin has not replied to my letter in the Journal of August 24, I conclude that he either has not seen it or has nothing to say in support of his process. In the Henderson process, where "tower liquor" is used, the roasted ore is lixiviated with acid and salt, and therefore the only novelty I can see in M. Dronin's process is that he claims to dissolve the copper out of an undecomposed sulphate by means of an acid solution of brine. From my knowledge of chemistry I should consider this impossible, but should be glad to hear the opinions of men better qualified to speak on this important subject.—*Sept.* 12. ——— C. E.

CORNISH MINERALS.

SIR,—In turning over some old papers in my office a few days ago the enclosed memorandum turned up. If you think that its publication would interest your readers please insert it in the Journal. If you do so I will endeavour to supplement the same by another memorandum, giving an account of sales subsequent to the dates given to the present time, to show the vast amount of mineral produced by a few only of our Cornish mines. R. SYMONS.

Truro, Sept. 7.

Amount of returns of the value of minerals sold from the undermentioned mines during the undermentioned periods:—

Name of mine.	Period.	Value of minerals.
Carn Brea	From Sept. 30, 1836, to Sept 29, 1865	£1,643,485 15 7*
Tincroft	From ditto, to March 25, 1865	74,866 7 10†
Wheal Seton	From commencement to Sept. 29, 1865	459, 3 4 11
West Wheal Seton	From ditto, to Dec. 25, 1865	458,1 6 9 11
East Pool	From Sept. 30, 18 6, to Dec. 25, 1865	372,.86 13 8‡
Wheal Busy	From ditto, to Dec. 25, 855	1,501 16 2§
Great Wheal Busy	From commencement to Sept. 29, 1865	209,648 19 4
Wheal Agar	From ditto, to June 24, 1865	47,478 10 1
West Wheal Tolgus	From 1861, to Dec 25, 1865	10,333 4 0

* This amount does not include tin from 1836, 1837, and 1838. † Ditto.
‡ This does not include tin for 1836, 1837, and 1838. § Ditto

PANDORA MINING COMPANY.

SIR,—I read with astonishment the article under the above heading which appeared in last week's Journal. I have to remind you that you specially invited me to write an article on the same subject which you published the previous week, when you also voluntarily offered to insert it in any part of the paper I pleased. You personally received from me the manuscript of that article, which you read, and made some alteration in. Subsequently you showed me the proof, which I noticed you also read carefully after I returned it to you.

When, therefore, the writer in your Stock Exchange column says that "too much attention cannot be directed to the Editorial repudiation, in another column, of a communicated paragraph published in last week's Journal," he unwittingly censures you for what I consider a grave act of injustice. One week you invite my "communicated paragraph," and having repeatedly perused and then inserted it, you deliberately approved of it; and the next week, because the person implicated does not like it (as he naturally would not do, the truth being shown in a way which could not be contradicted), you turn round and repudiate what you had invited and sanctioned.

When I was informed that Mr. Crofts had called upon you; and that you had been threatened with legal proceedings (no doubt the clue to your "repudiation"), I at once authorised and even begged you to give up my name as the author of the article, adding that I was prepared to substantiate every word of it, if Mr. Crofts should be so foolish as to raise the question. Nine-tenths of the contents were statements of fact, which are not and cannot be denied. The rest was the natural deductions. You say that "the question originally at issue was a simple one—the rejection of a certain offer of terms—and when that offer had been withdrawn the management should have contented itself with giving a dignified answer to certain charges made against it in its official character." You overlook the fact that while Mr. Crofts withdrew his "proposals" as soon as, and only when, he found he had no chance of carrying them, he did *not* withdraw the "charges" with which he had occupied two long printed circulars, but repeated them at the meeting from a written document which he then read.

Nothing was said at the meeting either by the Chairman or myself which was not strictly in reply to Mr. Crofts' statements; and I challenge you or anyone else to point out otherwise. When, to carry out a personal object, a man makes deliberate and serious charges which he not only cannot substantiate, but the most important of which he knew to be unfounded, as shown by his own previous declarations; and when he makes important denials which are simply quibbles upon words, then I maintain that he "has resorted to tactics which for his own sake it is best to refrain from alluding to." If statements which have been made "reflect very strongly upon the action Mr. Crofts took in the matter," he has only got his deserts, which he alone has brought on himself.

Sept. 11. ——— J. H. MURCHISON.

PATELEY BRIDGE LEAD MINES AND SMELTING COMPANY.

SIR,—If "honour should be given to whom honour is due," to Capt. Charles Williams, the manager, alone is due all the honour of the valuable discovery which has brought our magnificent property into its prosperous and still more encouraging condition. True, as stated by an "An Original Shareholder," "our mine has proved all that was expected," but untrue that Mr. Batters or Capt. Williams, of Van, had anything whatever to do with the discovery, for the obvious reason that the level had been commenced and was in active prosecution long before Capt. Williams had been in the district, or, it may be, had even known of the mine. The vapid utterances of "An Original Shareholder," so transparent in their design, have defeated their object, turning shareholders' sympathies in a direction just opposite to that fondly wished for.

"An Original Shareholder" may be surprised to learn—yet would know if he be a shareholder—that Mr. Batters has by disqualification ceased to be a director, and that the apocryphal "man in the moon" had just as much to do with obtaining the debenture capital as had this ex-director. Than this "Original Shareholder" no one knows so well that but for this debenture capital the collapse of the company was inevitable. He, too, is fully aware that shareholders distinctly refused to subscribe capital under the old *regime*, and equally acquainted is he with the patent fact that without this capital, subsequently subscribed, the discovery must have benefited others—certainly not present shareholders.—*Sept.* 9. FAIR PLAY.

PANT-Y-MWYN MINE (MOLD).

SIR,—In last week's Journal I notice "Observer" accuses this company of inactivity, and also challenge the report of the mining agent. Knowing as I do some little of this property, as also its operations during the last few years, perhaps you will permit me to state a few facts in connection therewith, which, although they will not meet all the queries of "Observer" (through lack of the necessary information on my part), yet, I trust, will convince him his accusations are somewhat unjust. Captain Wadley, the first manager, only sunk Griffiths' shaft five yards in three years, and there were only a very few men employed, neither was there any ore in sight. The company dismissed him and appointed the present manager, Captain Thomas Hughes, than whom a better or more competent man it would be impossible to find. Under his management operations commenced in earnest, and during his two years' service the following work has been accomplished. The first level driven was 10 yards below day level west, and has been driven 34 yards, and large quantities of ore extracted therefrom; this was the first discovery made by the present company. Griffiths' shaft has been sunk 25 yards, penetrating very rich ore, a level also has been driven east 119 yards and west 70 yards. An engine has been erected for pumping and also two for winding, and I believe the former is equal to present requirements. I might go on with more minute details, but these, I think will convince "Observer" that a considerable amount of work has been done during the last two years, and I think Captain Hughes is deserving of the highest praise for having brought the mine into its present prosperous condition.

Sept. 12. LIVERPOOL.

FOREIGN MINING AND METALLURGY.

There is scarcely any change to report in the state of the iron trade in the St. Dizier district. The works are carrying on operations upon a small scale, and their production is run off with difficulty; nevertheless, it is disposed of, although upon terms which must be regarded as indifferent and discouraging. In the Ardennes the situation is described as "deplorable"—iron is quoted in this district at 6*l.* 12s. to 6*l.* 16s. per ton. The foundries and some of the other industrial establishments of the group are also receiving comparatively few orders. In the Meurthe-et-Moselle business is concluded with some difficulty. Sales of pig for refining have proceeded sluggishly; the quotation at Nancy is nominally 2*l.* 8s. per ton, and at Longwy 2*l.* 4s. 9d. to 2*l.* 5s. 6d. per ton. Second fusion pig is quoted in the Meurthe-et-Moselle at 2*l.* 16s. to 2*l.* 17s. 6d. per ton.

The works of the concession of the Rochebelle and Cendras, in the coal basin of Alais (France), have just been sold to the Mokta-el-Hadid Iron Minerals Company for 204,000*l.* An important discovery of coal (lignites) has just been made in the commune of Corbier, near Menton.

A meeting just held at Dortmund, and attended by representatives of 47 collieries of the district, has decided on making a small advance in the price of coal for domestic purposes. This advance has been enforced as from Sept. 1 in the pits east and west of Dortmund. Several important contracts for *matériel* are about to be let by the managers of German railways. Thus the Mein and Weiser Railway Company will give out on the 14th inst. contracts for 2242 tons of iron sleepers and 3412 tons of Bessemer steel rails. Orders are also about to be given out for 10,000 iron sleepers for the Cologne and Minden Railway. A few days later the same undertaking will let a contract for 3000 tons of steel rails. Some other smaller orders for steel rails are also about to be given out for German lines.

Contracts for coal which have just been let by the Administration of the Belgian State Railways were given out at very low rates. As regards the Belgian coal trade generally, there is little new to report; the Belgian State Railway contracts only too faithfully reflect the prevailing depression. It is necessary to effect sales, and these sales appear to be effected upon almost no matter what conditions.

It cannot be exactly observed that negociations make default in the Belgian iron trade, but when we come to deal with the transactions actually concluded it is quite another thing. Thus there have been many inquiries as to prices on foreign account as regards merchants' iron and girders. These inquiries have not come to anything at present, but still there are hopes and expectations that the negociations commenced will lead to the conclusion of some contracts for the winter. M. Schneider, of the Creusot Works, having complained that the Belgian Government systematically shuts out French products from Belgium, publicity has been given to a letter addressed in January, 1874, by the French Minister of Marine to the John Cockerill Company, and conceived, *mutatis mutandis*, in a somewhat similar spirit. Iron permanent ways on the Serres and Battig system has just been laid down upon a portion of the Great Central Belgian Railway, between Walcourt and Berzée, near Charleroi, and on the Liége and Leinbourg Railway between Liers and Glons, near Liége, the system thus receiving a fair trial. It was constructed very rapidly, although upon the Liége and Leinbourg Railway operations had to be carried on at night, and under very disadvantageous conditions. The direction of the Belgian State Railways is about to make a trial of the same system, and has ordered the necessary *materiel*. The John Cockerell Company has further determined upon trying the system upon some short lines at its works. The Belgian Commission formed in connection with the Paris Exhibition, has just issued a circular inviting Belgian exhibitors to give all possible publicity to the nature and merits of their products.

Meetings of Public Companies.

SILVER PLUME MINING COMPANY.

The ordinary general meeting of shareholders was held at the offices of the company, Great Winchester-street, on Tuesday,

Mr. JOHN CARR in the chair.

Mr. ORCHARD (the secretary) read the notice calling the meeting.

The CHAIRMAN said the directors were more than ever confirmed in the opinion that the company possessed a good mine. The vendors had behaved neither dishonourably nor dishonestly, but had certainly not shown themselves good men of business. He believed that the men on the other side with whom the directors had to deal were as honourable men as could to be found in Colorado. The present proposal involved those men finding half the money which would be required—2500*l.*, to give the mine one more trial. Mr. Forster, who had served the company so long and with so much integrity, would again take charge, so there was the assurance that the trial would be properly and honestly made. The difficulty which the directors had written to the vendors about was that there were some debts on this side which must be met, such as salaries and advances made by shareholders and directors out of their own pockets, and the proposal was that they should claim no interest upon their advances, and should be paid the balance in such bonds as were about to be issued. The directors thought that was a fair proposal. There was no doubt that the difficulty of this mine had been the lawsuits, and the bad conduct of the managers on the other side.

Mr. ORCHARD then read the following report of the directors:—

The last general meeting was held in November, 1877, and this meeting has been summoned somewhat earlier than the prescribed time, in order to lay before the shareholders a proposal which has been made to the vendors, which if accepted by them (and the directors have every confidence it will be) will place the company in a strong position once more, and prevent any further chance of litigation and unpleasant recrimination between those interested in the successful working of the property. The shareholders were informed as long ago as last November that the lawsuit was withdrawn by the vendors, and the company were again in undisturbed possession of their property, but nothing has been done at the mines during the past year for want of funds. In order, therefore, that this state of stagnation may cease various proposals have been made to the vendors through Mr. E. L. N. Foster, our manager, and while they are quite willing to compromise their demands hitherto have been excessive, and the directors have not felt justified in acceding to them. A proposal authorised by the directors was made on July 20 by Mr. Foster to the vendors, so as to avoid any chance of future complications, to substitute for the old contract of purchase a new one, by which the deferred payment of 25,000*l.* is paid by the allotment of shares in the Silver Plume, and for this purpose it was proposed that the company's capital be increased to 4 ,000*l.* ; that out of the new shares thus created 17,500*l.* fully paid, be issued to the Snider Company, equal to the present capital of the Silver Plume Company, and the remaining 5000*l.* be left unissued, except to redeem mortgage debentures, 5000*l.* worth of which it is proposed to take power to raise for use as working capital, and payment of the present indebtedness of the company. Of this 5000*l.*, 2500*l.* would be raised in cash; 1500*l.* would be given, one-half to the Silver Plume Company, and the other half to the Snider Company with which to settle their respective debts. The debts of the Silver Plume Company amount to about 3 00*l.*, of which sum the directors have agreed to canc l their fees of 1500*l.*, and the other creditors to take 10s., or less, in the 1*l.* in debentures, will relieve the compan yfrom financial difficulties, the remaining 1000*l* debentures to be held in reserve.

The terms of these debentures are named in the reso ution, which will be submitted to the extraordinary general meeting to be held immediately for approval. Mr. McCullough (the vendor's agent) has acknowledged by telegraph the receipt of the proposals, and the dir ctors confidently expect the final acceptance of the proposed terms in time to lay it before this meeting. The financial statement, or balance sheet, has been prepared by the company's auditor, Mr. Hugh S. Fuller, of 57, Moorgate-street. The debit items have been increased only by London office expenses 150*l.*, directors' fees 300*l.*, but as these amounts have never been paid they are only figurative items. On the other side of the account, however, the sum of 99*l.* 14s. 1d. has been credited, which amount has been a disputed account in Colorado, but has been settled by the Court in favour of the company.

The CHAIRMAN said that Mr. Gray was now debared from any further proceedings against the company.

The SECRETARY said that the balance-sheet of this year was almost identical with that of last year, but in reality they were about 900*l.* better off than last year.

On the motion of the CHAIRMAN, seconded by Dr. SMART, the report and accounts were received and adopted.

The meeting was then made special, for the purpose of passing the following resolutions:—

1.—That the second resolution passed at the special general meeting of the members of this company held on March 4, 1873, be, and the same is hereby rescinded.

2.—That the condition contained in the second resolution passed at the extraordinary meeting held on Oct. 15, 1873, be and the same are hereby rescinded.

3.—That the conditions contained in the Memorandum of Association be modified, and that the capital of the company be increased by 22,500*l.*, making the total capital of the company 40, 00*l.*, and that such additional capital of the company be raised by the creation and issue of 22,500 new shares of 1*l.* each.

4.—That the directors be empowered to borrow a sum or sums of money not exceeding 5000*l.* sterling at 20 per cent. interest, for all or any of the purposes of the company, upon the security of a mortgage or mortgages, of all or any part of the company's property, or assets, bill, note, or other security.

5.—That the directors be and are hereby empowered to offer to the vendors as full payment for the company's property in lieu of the existing terms as named in the contract between the vendors and the company, 17,500 fully paid shares in the company, and 750*l.* of fully paid debentures, or such other shares and debentures as they may deem advisable.

In answer to a question by the CHAIRMAN, Mr. FORSTER said that if they had 2500*l.* to lay out in developing the mine there was every probability that they would come upon large deposits of ore, such as had been already worked, and which would repay the shareholders. When he first took charge of the property he had no resources at his command, and he got into considerable difficulties, but, as luck would have it he came upon a good pocket of ore, and very soon the mine paid largely, which led to further discoveries, and he came across other deposits. These also paid largely, and it was only on account of work being stopped by the Courts, and having injunctions served, that the company was unable to continue working. Then the mine passed into the hands of a receiver, of whom he was one, but it was not so successful in the hands of receivers, and the consequence was the deposits of ore in sight were exhausted, or nearly so, and the mine was now in much about the same state as when he first had it. With the sum of 2500*l.* they would be able to do such work as would again put the mine in a paying condition, and prove whether it was worth spending any more money upon it.

The CHAIRMAN asked whether the mine had been worked fairly, or whether the eyes had been picked out?

Mr. FORSTER said the mine had been fairly worked, and in developing it a proper amount of reserves had been left.

On the motion of Mr. WILSON, seconded by Dr. SMART, the resolutions given above were then passed.

On the motion of the Chairman, seconded by Mr. WILSON, a vote of thanks was passed to Mr. Orchard and Mr. Forster, and the meeting broke up.

ECLIPSE GOLD MINING AND QUARTZ CRUSHING COMPANY (IN LIQUIDATION).

A meeting of shareholders, convened by Mr. C. S. Nelson, late assayer and accountant, also acting manager and superintendent to the company, was held at the Guildhall Tavern on Wednesday,

Mr. C. S. NELSON in the chair.

Mr. HARSTON, solicitor, said he wished to explain how he became connected with the present meeting. He was well acquainted with California, and Mr. Nelson brought home from a friend there, an English barrister, a letter enclosing claims from creditors of the company to the extent of 4000*l.*, and asking whether something could not be done to get those gentlemen paid. He told Mr. Nelson he would enquire into the matter, and sent to the company's office, but there they would give him no information, stating that the company was wound up, and there was an end of it. However, he ascertained that on June 13 the final resolution or report was filed at the Joint-Stock Company's office by Mr. Bluett and Mr. J. H Taylor, joint liquidator. Supposing that resolution to be in order on September 13, or within three months, the company would become dissolved, and every remedy would be gone. He had reason to believe that the proceedings had been irregular, and even if Sept. 13 were allowed to pass the company would still be in existence for all purposes. But in order to avoid any chance of the kind it was desirable, if anything were done, that it should be done before the 13th Mr. Nelson was a creditor of the company for about 700*l.*, and had all the information regarding the position of the company in his possession. It was desirable if anything were done that the company should be wound up compulsorily, so that the accounts might be thoroughly investigated. He did not want a petition to be filed—he did not care if one was filed or not. He was not certain whether the Californian creditors, whom he represented, would take any steps or not. Mr. Nelson, who called the meeting, would state what he knew of the management of the company. He did not believe the shareholders would ever get a shilling, and he even doubted whether the debenture holders and creditors would ever get a shilling, as he was told that the persons who would be held responsible were not in a financial position to meet such a demand upon them, and the company's mine had been "jumped" by the very man who had sold it to the company.

Mr. NELSON said he was sent out in July, 1876, as assayer and accountant. When he arrived there he presented his credentials to Capt. Udey. He soon found that although Capt. Udey was a good miner he was no millman, and he soon came to the conclusion that Capt. Udey was not fitted to have charge of the mill. The agent advised his return to London, but when he telegraphed to England on the subject he was told that if he came over it would be on his own responsibility. However, he came over, and when he arrived in London reported himself at the company's office. Mr. Hulbert was appointed to go out, and he went with him, and on their arrival found everything as he (Mr. Nelson) had stated, and thought he had used good judgment in returning. When Capt. Udey's time was up Mr. Hulbert removed him from the mill, and he (Mr. Nelson) secured a proper man in his place. The mine at that time was down about 350 ft., and when he arrived and had charge he ran it down about 40 ft. more, and found a better quality of ore. He heard nothing from the London office from the time Mr. Hulbert left, in April, until his arrival in London. Whatever Mr. Hulbert did he did to the best of his ability; it was uphill work, as there were many debts to pay, and much of the m ney which Mr. Hulbert paid was for debts which Capt. Udey should have paid. Capt. Udey sued the company for about $6000, and the directors in London were written to by him (Mr. Nelson), but no notice was taken of it. He himself fought Capt. Udey's claim in the United States Circuit Court, S F., and beat him. He was a servant of the company up to last July. Before that date Prof. Rickard, F.C S., arrived out, and investigated all his books, and found everything satisfactory. Prof. Rickard stayed at the mine about one month, but as he could not get any satisfactory information from London in answer to his telegrams he left for San Francisco, leaving him (Mr. Nelson) in charge at the mines, that was in September, 1877. Previously, and while in San Francisco, he could get no answers to his very numerous letters of vital importance, although Mr. B uett told him on his departure from London that he only had to telegraph for what he wanted and it would be supplied. Both Prof. Rickard and myself sent home offers for leasing the company's property, and many a good sum could have been obtained if London had been prompt, but they did not even condescend to answer, thereby saving a greater portion of the good money wasted. If he (Mr. Nelson) had had the power he could have realised a large sum for the property with its proper titles, &c. He should not have known that the company was being wound up had it not been for a report of the meeting which he saw in the *Mining Journal*. Prof. Rickard was disgusted with the way in which he was treated, and wrote a letter to that effect. He (Mr. Nelson) did not draw his salary, and even had all his effects seized for debt, as part of the property of the company. He had saved the company thousands in expenses. When he returned to London and reported himself at the office, Mr. Bluett threatened to kick him out, and referred him to the company's lawyer, who informed him that he had no further connection with the company. The shareholders would see the manner in which the property had been wasted, and, as a matter of fact, the company had never had the American patent legally conveyed to it. Of course he was powerless to do anything singly, and, therefore, he had called the present meeting to know whether the shareholders, who had been such heavy sufferers, would consider it worth while to take steps to stop the present liquidation.

A SHAREHOLDER asked if the mine was of any value if the liquidation were stopped?—Mr. NELSON said he believed they had a good property if it were properly worked; and if the shareholders gav it up he had no doubt that some one would take it, and make a good property out of it.

A SHAREHOLDER asked whether Mr. Nelson ever made any assays out there? He asked the question because at meetings of the company it had been stated that Mr. Nelson had never sent home any assays.—Mr. NELSON said the assays had been regularly and frequently made, and some results sent home to this country.

The SHAREHOLDER said he did not in any way intend to th ow any imputation upon Mr. Nelson in asking the question, but he simply asked for information. The assays generally averaged from $20 to $22 of stuff, but at times they went down to $5 and $3 owing to the ores being washed.

A SHAREHOLDER said he had attended all the meetings of the company held in London, an I he generally came away from them about as wise as he went.

Mr. NELSON said the accounts out there had been kept in a very defective way. There was no capital account. If Capt. Udey could not pay all the cost sheet one month a portion of it would stand over till the next, and it was utterly impossible to tell whether or not any profit was being made. If the mine had been sold, as it might have been, the shareholders would have been saved a great deal of expense.

Mr. HARSTON, in answer to a remark, said it was very desirable to see where the money subscribed by the shareholders had gone, and whether there had been any misrepresentations in statements upon which the debenture holders were induced to part with their money. Capt. Udey got the patent of the mill site, and never made it over to this company, until Mr Hulbert went out, and he (Mr. Hulbert) had great difficulty in getting it from Capt. Udey. The patent for the mine property was never secured, although Mr. Willet received some 10,000 "S" shares, besides expenses in cash, for proceeding to California and securing the same. (*Vide* Articles of Association.) The Californian creditors thought the money had been got rid of in an improper way, and that the accounts should be investigated, and the directors made personally responsible.

Some consultation ensued, but there seemed a disinclination on the part of the gentlemen present to assist pecuniarily in any action for stopping the liquidation. The creditors in California will be communicated with, when it is the intention of Mr. Nelson to call another meeting, and endeavour to get the shareholders to save the valuable property from slipping out of their hands.

SOUTH WHEAL FRANCES MINING COMPANY.

A four-monthly meeting of adventurers was held on Tuesday, the purser (Mr. S. ABBOTT) presiding. A most satisfactory statement of accounts was presented, the result of the four months' working enabling the management to declare a substantial dividend and carry forward a good balance. The accounts showed a profit of 1539*l.* 1s. 4d., which added to 517*l.* 18s. 2d. balance from last account, made a total credit balance of 2056*l.* 19s. 1d., less 50*l.* to West Basset for general repairs. A dividend of 5s. per share was declared.

The agents' reported that—Since the last meeting we have laid down 55 new frames for dressing the slime tin a second time, and an entirely new dressing floor has been laid down at the burning-house yard, which will enable us to dress the tin at a much cheaper rate than before. We need not tell you that this could not be accomplished without great expense both in labour and materials. A glance at the merchants' bills will soon convince you of this fact, and we must still continue to enlarge and improve our stamps dressing floors, until it is commensurate with the improved condition of the mine. The cost of preparing a ton of tin for the market is very considerably reduced. The total cost in la our, including agencies, stamps, and burning house watchers is 1*l.* 11*l.* 6d. per ton of tin, and one third per ton of tinstuff taken from the stamps passes. The average wages paid to underground men and boys during the past sixteen weeks are as follows:—Men, 3*l.* 1 s 4 l ; boys, 1*l.* 15s. per four-weeks month. We have sold for this account about 180 tons of tin ore at an average price 34*l.* 8s. per ton, which is about 1*l.* per ton below the average price realised for the last meeting. All the ends of the mine are looking well. The stopes are yielding their full supplies of tin, and the mine never presented more permanent features of success than at present.

The PURSER remarked that it would be satisfactory to the adventurers to know that under the circumstances they had been able to make not only a respectable but, as he considered, a very handsome profit—(hear, hear)—and he congratulated them most heartily on the circumstance. He believed all their known liabilities were included, and in the account there were charges which were rather more than their fair charges for the 16 weeks. For instance, their merchants' bills had been paid promptly, and more than that the balance sheet included liabilities which rightly belonged to the ensuing quarter, but which had already been paid to the advantage of the next account. Their bankers' charges during the past three or four years had amounted only to 4*l.*, so that they had been able to satisfy their creditors without having to draw upon the bank.

Mr. DINGLE moved the adoption of the report and accounts. In the present state of mining, and after the things they heard from week to week, it was most satisfactory to find a credit balance of over 2000*l.* While other ine which used to be shining meteors in the sky had disappeared behind th clouds, South Frances had come to the front, and had now a fair prospect of doing something for those who had stood by it so faithfully through its troubles. He desired it to be generally known that the mine was conducted on the most honest business principles. All the charges were charged up to the lowest possible point, their merchants' bills were met regularly and satisfactorily, and their accounts were kept so straightforward that bankers' charges did not appear in them.

Mr. PENROSE seconded the motion, and congratulated the adventurers upon the highly favourable statement of accounts. It must be a matter of great satisfaction to the adventurers now, having stuck so faithfully to the mine, to find that they had so good a property. It was also something to show to the mining world that they could in these times r turn something like 6000*l.* in four months, and make a profit of 1500*l.*, a profit representing 25 per cent. of their earnings, and that with the present price of tin (Hear, hear.)—The motion having been agreed to,

Mr. R. H. WILLIAMS remarked that they had passed through many difficulties, but they had never deviated from their straightforward way of doing business with their merchants, and the adventurers had honestly and manfully responded to the calls made upon them. But with a good management the success which had been predicted had come at last. The report was one satisfactory in the extreme, and he believed there was one end of the mine worth more than 1 ton of tin per fathom. The mine appliances had been so improved as to turn out in four months 18 tons of tin. They had met together when they could reckon on only 2 or 3 tons a month, and from that fact alone they could judge of the great improvement which must have been made. Acts of financiering of a condemnatory character their management had nothing to do with, and he hoped the publication of their statement of accounts would counteract the tide of dissatisfaction which existed, and would assure the public that a mine could be well and respectably conducted, and that it could do, as all mines should do which raised a large amount of tin, show a balance in favour of the adventurers. They had had to meet difficulties before; they had had times of equal depression before, but Cornwall was equal in the past to the emergency, and there were men in the county equal to the emergency now. South Frances had passed through its troubles; they had now come to times of prosperity, and it was his pleasure to propose that they should, to-day, declare a dividend of 5s. per share. (Applause.) When that was paid it would leave them a respectable balance of nearly 1000*l.* They did not declare a dividend because they were needy, but it went to show that it was possible to work a mine in Cornwall honestly, and to the profit of those concerned, and he believed the result of their meeting that day would have a most beneficial effect upon Cornish mining.—Mr. DINGLE seconded the resolution. The moderate dividend they were about to declare would show that they intended working the mine. They could have declared a 10s. dividend had they felt disposed, but they desired to improve the mine still further, and they intended spending money upon it for its continued development.—A dividend of 5s. was then unanimously declared, and a balance of 881*l.* 9s. 6d carried forward to the credit of the next account.—On the motion of Mr. Dingle, an increase of a guinea a month was unanimously voted to the salaries of the purser, manager and agent, in recognition of the services rendered by the staff, and the meeting terminated.

— *Western Daily Mercury.*

A VISITOR ON THE SNAEFELL MINE.—A tourist says:—"I made my way down by the Snaefell Mine, and there I saw as nice a machine for the crushing and cleaning of ore as it is possible for such an article to be. Its simplicity and its effectiveness for the purpose are unquestionably good; and what must be cheering news to the shareholders, a good quantity of metal was on the floors ready for dressing, and a fair quantity below for blasting out, and taking to the surface. Geologically speaking, I have no more doubt of the Snaefell Mine being as good a trump card as ever the Great Laxey was. But it seems inexplicable that no level has been driven from the 30 and 40 fms. sunk last year, nor yet pumps put in. Would the captain explain why this is so? I am persuaded if more force is put into this mine—as there is no want of means to work it—that it would shortly requite the shareholders for their outlay. I ask the question who is to blame, or why this mine has not been driven from its lowest depth, for Laxey did nothing for its shareholders till it got depth? I have heard it said that the Snaefell lode is a 'huge mound.' To those I would answer, Snaefell lode is the trunk lode of the Great Laxey Mine, and will produce metal in as great abundance as ever Laxey did. Geology is as true to itself as the fruit-bearing tree is to itself. Compare geologically, the Great Laxey and the Great Snaefell, the upheaving is in the Great Snaefell's favour, and as the Great Laxey has proved itself on these grounds to be a mine of great wealth, so will the Great Snaefell do also."—*Isle of Man Times.*

Registration of New Companies.

The following joint-stock companies have been duly registered:—

SENTEIN MINING COMPANY (Limited).—Capital 32,000*l.*, in 1*l.* shares. To work lead, silver-lead, and zinc mines in the Arrondissment of St. Girons, Ariege, France, according to the terms of an agreement made between A. L. Jeffree, of 14 Great Winchester-street, and A R. Marten, of 63, Queen Victoria-street. The subscribers (who take one share each) are—Walter Standing, 63, Queen Victoria-street, merchant; S. Nugent, 33, Chancery-lane, barrister; A. R. Marten, 63, Queen Victoria-street, merchant; H. G. Kirkpatrick, 38, Eccleston-square, no occupation; J. R Coombs, 14, Great Winchester-street, secretary; G. A. Pope, 7, Bucklersbury, solicitor; B. Shillitoe, 2, Frederick-place, E.C., surveyor. The directors are Messrs. Fitzpatrick, Marten, Shillitoe, and Standing.

BELGRANO BUENOS AYRES GAS COMPANY (Limited).—Capital 100,000*l.*, in 10*l.* shares. To supply gas to the town of Belgrano, Buenos Ayres. The subscribers (who take one share each) are—F. A. Hankey, 52, Threadneedle-street; George Wythes, Brockley, Kent; J. Olgwin, 107, Cambridge Gardens; A. T. Hooper, Moorgate-street; A. Oglivie, 4, Great George-street; S. P. Kennard, 5, Great Winchester-street; C. J. Hegan, Lloyds.

UNIVERSAL FRILLING MACHINE COMPANY (Limited).—Capital 2000*l.*, in 1*l.* shares. To supply machines for frilling.*

WEST OF ENGLAND GENERAL SUPPLY ASSOCIATION (Limited).—Capital 20,000*l.*, in 2*l.* shares. To carry on business as a co-operative society. The subscribers (who take one share each) are—J. D. Murphy, Southport; B. F. L. Kettle, 32, Lord-street Liverpool; R. W. Kettle, Southport; R. G. Fairbridge, Birkdale; J. Goulding, Woodside, Cheshire; J. Lees, Mellor, Derbyshire; H. Wharton, Moss Grove, Liverpool.

LONDON AND NEWCASTLE MUTUAL COAL ASSOCIATION (Limited).—Capital 10,000*l.*, in 1*l.* shares. To take over the business of Mr. Cooper, of Regent-street. The subscribers are—F. Cooper, Regent-street, 100; L W. Williams, Marlborough-road, N., 25; W. S. Ferguson, 27, Rye Hill, Peckham; T. B. Cameron, Camden-square, N.W., 1; F. W. Booth, Hornsey Rise, 1; T. Wrigley, 75, Chancery-lane, 1; J. Cheham, 3, Adelphi-terrace, 1.

THE ALCAZAR (Limited).—Capital 100,000*l.*, in 10*l.* shares. To take the site of Saville House, in Leicester-square, in order to erect a theatre. The subscribers are—W. Frost, 22, Montague-street, Russell-square; W. L. Lambert, 59, Palmerston Buildings; Alex. Henderson, 26, King William-street; H. B. Farnie, Great Malborough-street; A. G. Medwin, 34, Bruton-street; Lionel Brough, Percy Villas, Lambeth; Sefton Parry, Foy Villas, South Croydon.

CAMBRIDGE IMPROVED INDUSTRIAL COMPANY (Limited).—Capital 20,000*l.*, in 5*l.* shares. The objects of this company is explained by its title. The subscribers (all of Cambridge) are—J. Hough, 10; G. D. Livering, 25; R. Sayle, 20; J. Humphry, 5; H. J. Church, 25; W. Bond, 20; A. Welsh, 20.

A NEW MANGANESE BATTERY.*

This element consists of a cylinder of compounded and porous carbon, pierced with holes parallel to its long axis, which serves as a porous cup and collecting plate, and this, with a rod of zinc, is enclosed in a glass vessel. In the cavities in the cylinder is placed binoxide of manganese, and the outer vessel is filled with water containing about 20 per cent. of chloride of zinc as free from lead and as neutral as possible. This couple may be recharged without recourse to the maker; and with it there is not formed the double chloride of zinc and ammonium that under certain circumstances incrusts the porous cups. The avidity with which chloride of zinc takes up water prevents evaporation and the cessation of the current by the drying up of the exciting fluid of the battery.

— By P. H.: Comptes rendus de l'Académie des Sciences.

* From JAMES FORREST'S "Abstracts of Papers in Foreign Transactions and Periodicals," for the Proceedings of the Institution of Civil Engineers.

MOTIVE POWER.—The operation of the machine invented by Mr. GEORGE ANDREWS, of Oxford-street, depends on the property of attraction and repulsion of the negative and positive poles of permanent magnets respectively, the independent force counteracting the gravitation exercised by the weights employed to keep the revolving magnets turning, at the same time overcoming the friction to which every machine is necessarily liable; this force, therefore, has the effect of keeping the weights always wound up, and as the permanent magnets rather increase from use in power the machine will be self-sustaining as long as the material keeps in good order. By combining any number of magnets any required power might be achieved.

MINE VENTILATOR, AND AIR COMPRESSOR.—The invention of Mr. THOS. HESKETH, of Warrington, is designed principally for driving air through the passages or workings of coal or other mines to effect the ventilation of the same, but it is also applicable in all other instances where a considerable volume of air is required to be propelled through shafts or passages, or to be compressed into a reservoir or receiver. The apparatus consists principally of a series of feeders (similar to organ bellows) fixed in a suitable framing, and placed side by side and end to end, and in successive tiers above each other to any required limit, and connected together by trunks or passages to convey the wind. The whole numbers of feeders may be made to work together as a whole or in sections to divide the wind, as the case may require. Each series of feeders is worked by means of eccentrics keyed or fixed upon shafts, the said eccentrics being cast or made in halves, and bolted together round the shaft. At the end of each shaft is keyed or fixed a spur wheel, and the whole of these are connected together and driven by a main spur wheel actuated by steam or other power. The eccentrics may be so arranged that the whole series will work together, or they may be arranged in such a manner that each series shall work alternately, as may be preferred, and the trunks or passages may be so arranged that the air or wind from the whole series may all form one main current, or it may be divided and subdivided into as many currents as may be required.

PULVERISING ORES AND MINERALS.—In the construction of machinery adapted to the purposes of reducing to the required state gold, silver, copper, tin, and other ores, and generally for crushing fine all hard substances, Mr. THOS. H. TREGONING, of Basset Foundry, Pool, has patented several improvements. The machine is driven by steam, water, or horse power, and substantially consists of two circular plates of unequal sizes, so fixed as to work out of centre of each other, and making an eccentric motion. These plates are the grinding or crushing gear of the machine, and are kept at the required distance from each other and pressure on each other by the adjustment of a weight on a registering lever. The machine is fed by casting the material to be crushed into a receiving hopper, whence it passes into a hollow cylinder above the upper plate by an aperture. After being ground the eccentric motion of the plates forces the material into a gutter or "launder," whence it is removed in any direction by water or other means. At the end of the registering lever there is a reversible socket with (say) four indentations, for the purpose of receiving the spindle, in connection with bottom crushing plate. The motion is communicated to the upper plate of the crusher by means of shaft and driving wheels, whilst the pressure is regulated by the forcing up or letting down the lower plate by means of the registering lever. The improvements effected by this machine are a saving in the labour or power required for working, and an increase of 50 per cent. of material reduced in point of time.

MARSDEN'S BLAKE STONE-BREAKER.

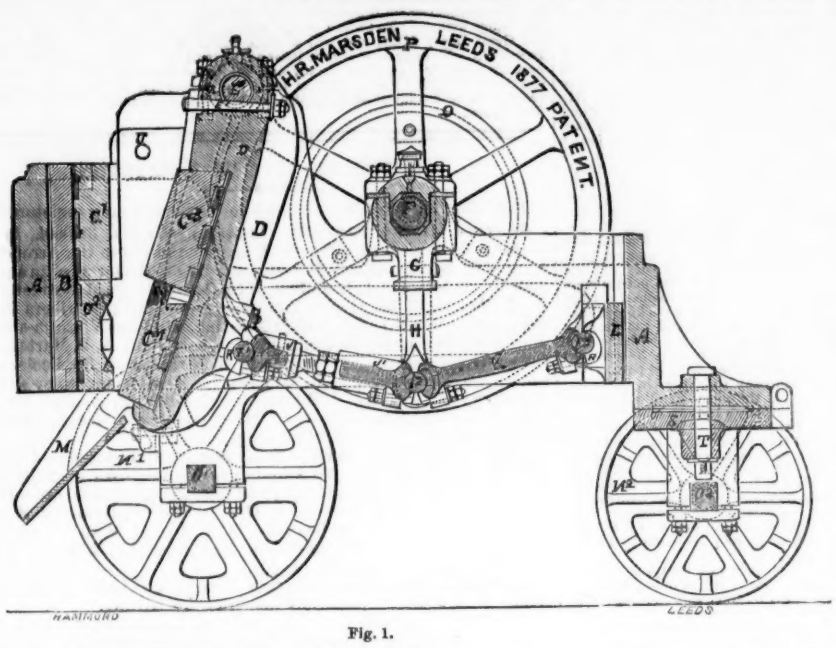


Fig. 1.

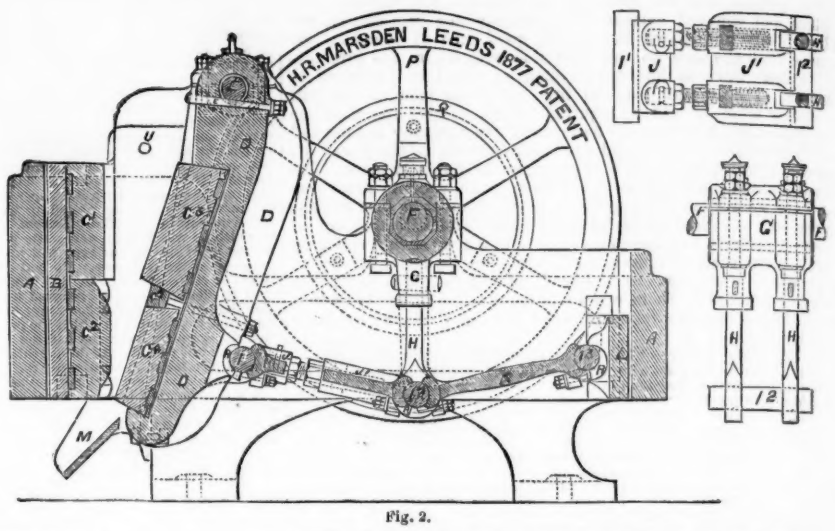


Fig. 2.

MARSDEN'S BLAKE STONE-BREAKER.

Not much of the labour-saving machinery of the present age has made such rapid and important strides as the world-renowned ore crusher invented and patented by Mr. H. R. Marsden, of the Soho Foundry, Leeds, and as the jurors at the Paris Exhibition have just made him the triple award of the highest prize—the gold medal, the silver medal, and honourable mention—attention may now be called to the above illustrations of these machines, because good as the old machine has uniformly proved itself wherever introduced, it is confidently stated by persons entirely uninterested in the patentee otherwise than as ordinary purchasers, and, therefore, users of his latest patented improvements, that there is an actual saving of more than 50 per cent. in the working expenses, and that they now take more than 25 per cent. less power to drive than the old style machine. There is the greater pleasure in thus bringing before the mining world the great benefit to be derived from the use of Mr. Marsden's patent when we see the old style machine has been frequently referred to as saving the labour of 50 hands, 30 per cent. and even 50 per cent. also being saved at mines through using it for preparing the stuff for the stamps. Special reference may be made to the paper and discussion "On the Treating of Ores," read before the Mining Institute of Cornwall, when Capt. Teague, having referred in his interesting and valuable paper to the cost of preparing stuff for the stamps, said he was inclined to think that this cost might be reduced by the use of Blake's stone-breaker placed in proper position, but what would be of greater importance was the uniformity of size produced by this machine compared with hand spalling; and Capt. Teague having asked Capt. Tregay to state his experience in reference to stone breaking, Capt. Tregay spoke in favour of Blake's stone-breaker, and said that 30 per cent. had been saved at his mine by the use of this machine, and that when exceptionally hard stuff was met with a saving of quite 50 per cent. was effected.

Reference may also be made to another paper "On the use of Stone-breakers," read also before the Mining Institute of Cornwall, in which the author, Mr. A. J. Campbell, says—"Even allowing that in some cases considerable alteration would have to be made to place the stone-breaker as it should be placed to become a labour-saving machine, a very great economy would be still effected by the use of such a machine or machines, especially where the rock is hard, and where large quantities of stuff have to be dealt with. The following figures were kindly supplied me by Capt. Tregay, of Pedn-andrea, and although the stuff in different mines varies greatly in hardness, toughness quantity to be dealt with, &c., they will I hope give some idea of the economy effected by the substitution of these machines for hand labour. Before reading out the figures I would remind you that in many cases the advantages in favour of the machine would be greater than here shown, as, for instance, where the cost or hand breaking is greater, or where more tinstuff would be required to be put through the machine in proportion to the tin returned. The cost of alterations would also be very much less in some cases:—

HAND LABOUR.	Per 100 sacks.
Cost of breaking	6s. 4d.
Deduct for dividing	1 3
	10) 5 1
Or per ton	0 6 1-10th

WITH STONE-BREAKER.

First cost of 20 in. by 9 in. machine	£400	
Alteration of floors	300 = £700	Per 100 sacks.
Interest on this sum, at 5 per cent., assuming 50 to be put through breaker per day		0s. 5½d.
Wear and tear		0 4
Coals and grease		0 4
Labour cost	3s. 3¼d.	
Deduct for dividing	1 3 =	2 0½
	10)	3 1¾
Or per ton		0 3¾
Hand labour	6 10th	
Machine	3¾	

2 7-20ths per ton in favour of machine

In this case, where the cost of hand spalling is calculated at rather below the average at many mines, and a very heavy charge is assumed for the alteration of the floors, there is yet a balance of more than 2¼d. per ton in favour of the machine. It is easy to conceive that, under different circumstances, this saving might amount to 4d. and even more per ton.

But this is far from being the whole of the economy effected by the use of the stone-breaker, since, in addition to this amount saved per ton in the actual breaking, there is another far more important source of economy, due to the fact that the tinstuff leaves the machine so efficiently broken as to effect a diminution in the amount of stamping power required equal to at least 25 per cent. When broken by hand labour the toughness and compactness of the rock is not in the least affected; and being broken chiefly at the heads or joints, it still retains its original texture, and, in fact, the only effect of hand spalling is to reduce the rocks from a large size to moderately small pieces. The machine, on the contrary, crushes up the rock, irrespective of joints or faces, and the strength and texture of the rock is so destroyed that the stamps can act upon it with far greater effect. The Blake machine, with the patented improvements and modifications introduced and made by Mr. H. R. Marsden, of Soho Foundry, Leeds, is so vastly superior to any other in use that I need not trouble you to name them. There are, it is true, other machines extant, but I can see nothing to recommend them to your notice. There is, too, a lately patented and decided improvement in these machines, styled by him the new patent reversible crushing jaw, by the use of which the expense of replacing the old jaw when worn out is done away with, for this, being made in sections, can be removed by any unskilled workman, and a new face put in its place in less than half-an-hour. This is of great importance, because in the old style you had to reject the whole jaw when worn out, and now with Mr. Marsden's new patent you have only to substitute a comparatively light casting, and besides which white metal for the joints is not needed."

All this refers, as already stated, not to Mr. Marsden's latest patented and improved machine, but to one which, while unanimously adjudged a good one, yet cost 50 per cent. more in working expenses, and takes 25 per cent. more power to drive than the present one. It is confidently stated that there is nothing to equal or bear comparison with this machine, and it is really surprising how anyone for the sake of first cost only will go in for the old machine when so many and such great advantages are offered in this.

Mr. Marsden has an able representative in the Cornwall and Devonshire district in Mr. T. B. Provis, C.E., Camborne, Cornwall, who will only be too happy to wait upon any enquiring parties, and fully set out to them the construction and detail of the machine, and any information they may require he will be able to give. While this is so the prices have been considerably lowered, owing to improved means of construction, and thus buyers are benefited all ways. All who wish to save labour are advised to examine into the merits of these machines if they have not already done so.

In the above diagrams wherein (Fig. 1), A is the main framing, and B a soft cast-iron backing piece interposed between the framing and the fixed jaws, C^1 and C^2. In place of the tedious process of running white metal behind the jaws they have now wrought-iron plates cast in one with them, and these plate strips are afterwards planed so as to fit flat against corresponding planed strips on plate B. The same mode of securing a good bearing is also adopted for the movable jaws. As will be seen, both the fixed and movable jaws are made in two sections. The upper section, which operates first on the stone, "sledges" it, and the lower section finally "cubes" it. In the former the pitch of teeth is coarse and arranged ridge-and-furrow fashion, whereas in the latter the teeth are finer and arranged tooth against tooth. The pitch of the teeth is varied to resist the size of road metal required. The mode of fixing, which is clearly shown, enables each section to be turned upside down when worn, thus rendering the jaws "reversible." Special attention is paid to the metal from which they are cast, and care is taken to thoroughly chill them. Great modifications have also been introduced in the toggle joints, which combine the drawback motion in a very effective manner, and prevent the excessive wear which used to take place at the joints of the old motion. The connecting rod is double, and consists, as will be seen by Fig. 2 of two cast-iron heads, G, with cappolts and wrought-iron rods, H, keyed into the heads at the upper end, and looped round the steel pin, I^2, at the lower end. The toggle-plate, K, is solid, but plate J is made in two pieces, and furnished with adjusting screws and locknuts for regulating the fineness of the broken stone, as shown. The pins, I^1 and I^2, are likewise of steel, and their ends are secured by caps and bolts to the movable jaw-stock, D, and to the piece, L, respectively. By means of the hooked bolts, R, the toggle-plates are made to perform a pulling as well as a pushing operation, and thus to do the duty of the drawback motion. By proper adjustment of the bolts, R, all slack can be taken up, and springs are entirely dispensed with. The wearing surfaces are large, and the whole construction is worked out in a manner high creditable to the inventor. The shaft and connecting rod bearings are of Marsden's patent compound anti-friction metal, arranged for easy renewal. From these diagrams it will be seen that the latest improvement consists in a modified arrangement of the toggles and pitman, with the object of diminishing friction, and from the results obtained in practice there can be no doubt that a far larger quantity of material is treated with a much smaller consumption of power. The machine has always been acknowledged to secure vast economy, and the long experience which Mr. Marsden has had in the manufacture of the machines has naturally enabled him to remedy such trifling defects as required to be removed in order to render the machine perfect.

DRESSING AND TRIMMING SLATES.

Some important improvements in connection with the dressing and trimming of slates have been invented by Mr. D. AULD, jun., of Cleveland, Ohio. It comprises the combination of a slotted arm, cross-piece, and adjustable cutters, the combination with the swinging frame of a slate-dressing machine, of a swinging treadle, and its connections; also cutters geared together in such a manner that the adjustment of one blade shall operate to properly adjust the other cutters. It also includes the combination of adjustable cutters, and punches secured to a single hinged frame carrying adjustable cutters, whereby the slate is securely held between the cutters as the slate is punctured by the punches, and suitable fastening devices, whereby the cutters may be adjusted in the swinging frame.

The operating portions of the machinery are carried by a specially constructed frame, to which is hinged or journalled a second frame designed to carry adjustable cutters and punches. One portion of this second frame operates as a shaft, and is suitably journalled or hinged to the main frame. Another portion is provided with a longitudinal slot extending along its entire length. In this slot is carried a cross piece, which may be adjusted and set at any point along the length of said slot. The said cross piece carries the adjustable cutters and a spring. The said cutters are made adjustable to any angle, and may be straight, angular, curved, or otherwise shaped to suit the form or design of the slate to be cut by them. When properly adjusted they are secured by suitable set screws or clamps. Another portion of this second frame is attached at right angles to the free extremity of the slotted portion, forming therewith a T-shaped device, and upon either arm of the same portion are placed adjustable punches, constructed to be adjusted at any desired point along the arm of the said swinging frame. These parts constitute the cutter and punch frame. There is an arm extending from the slotted portion of the swinging frame beyond the shaft. To this arm is attached a link, which connects it with an arm operated by a treadle. At the junction of the swinging arm and link is a spring or weight, which comes downward with sufficient force to retain the swinging frame in its elevated position. To limit the throw of the said swinging frame in either direction he provides a stop, which by impinging in turn against an arm and a lug upon the said swinging frame limits the throw of the same. Beneath the swinging frame is a slot in the stationary or main frame extending the entire length of the machine. This slot is designed for the accommodation of the lower adjustable cutters. The cutters are fixed upon a frame which may be set at any desired point along the said slot.

To facilitate their adjustment at a proper angle to each other the said cutters are provided with shanks terminating in toothed faces, which are geared together. When the said cutters are fixed at the desired angles they may be secured by suitable clamps at set screws. An adjustable gauge or stop-piece may be set at any desired point along the length of the said slot to limit the feed of the slate to be cut. The gauge is provided with a notch or slot for accommodating the ends of the cutters when it is desired to bring the said ends actually together in cutting diamond-shaped slate. Adjustable pieces provided with openings are fixed in such positions that the punches shall enter the said openings. Upon one of these pieces is provided a stop, which operates in conjunction with the said gauge to secure the slate in the proper position to be cut. When it is desired to trim but a single edge of a slate or to cut a slate in two a device is employed, consisting of a swinging blade provided with a counterweight, which serves to keep the blade in an elevated position when not in use. A spring may be substituted for the counterweight. The blade is pivotted to the main frame; behind its pivot is a link which connects the blade with a foot lever, by operating which the counterweight is lifted, and the blade forced down into a slot. A suitable stop limits the downward throw of the said blade.

HOLLOWAY'S PILLS—GOOD DIGESTION.—Holloway's pills are universally acknowledged to be the safest, speediest and best corrective for indigestion; loss of appetite, acidity, flatulency, and nausea are a few of the inconveniences which are remedied with ease by these purifying pills. They strike at the root of all abdominal ailments, they excite in the stomach a proper secretion of gastric juice, and regulate the action of the liver, promoting in that organ a copious supply of pure, wholesome bile so necessary for digestion. These pills remove all distention and obstruction, and from their harmless composition are peculiarly well adapted for delicate persons and young children; whilst casting out impurities these excellent pills strengthen the system and give muscular tone.

The "BURLEIGH" ROCK-BORING COMPANY
(LIMITED).
100, KING STREET, MANCHESTER.
RICHARD MOTTRAM, Secretary.

For the Sale of the "Burleigh" Rock Boring Machinery; and also for Sinking Shafts, Cutting Tunnels and Levels, and General Rock Blasting Operations by Contract

References permitted to—
Messrs. BOLCKOW, VAUGHAN, AND CO. (LIMITED), Middlesborough.
" THE DOWLAIS IRON COMPANY (LIMITED), South Wales.
" THE EBBW VALE STEEL, IRON, AND COAL COMPANY (LIMITED), South Wales.
" THE CREMLIN VIADUCT WORKS COMPANY (LIMITED), South Wales.
" T. T. J. WALLER, Esq., Railway Contractor, Gisburn, near Skipton.
" TURNER AND SON, Limestone Quarries, Kiverton Park, near Sheffield.

CATALOGUES AND PRICE LISTS OF MACHINERY FORWARDED ON APPLICATION TO THE COMPANY'S OFFICE.

ORMEROD, GRIERSON, AND CO.

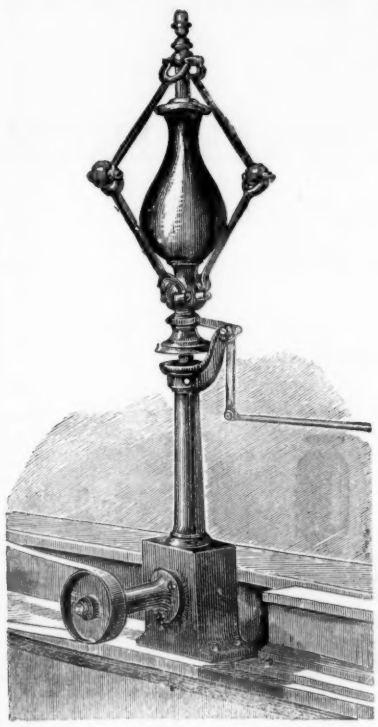
ST. GEORGE'S IRONWORKS, MANCHESTER,

Engineers, Millwrights, & Boiler Makers,

MANUFACTURERS OF

Stationary Steam Engines and Boilers for all purposes, Mill Gearing, Sugar Machinery, Cranes, Turn-Tables, and Railway Fixed Plant of all descriptions; also, the Diamond Rock Boring Company's Plant—viz.: Compressed Air and Air-Compressing Engines, Prospecting Machines, Tunnelling Machines, and Shaft Sinking Machines.

HYDRAULIC PRESSES OF VARIOUS KINDS



Porter's Governor for Stationary Engines. Also Governors on the same principle adapted for Marine Engines.

Have the Largest Assortment in the Trade of

PATTERNS,

WITH MACHINE-CUT TEETH, OF

SPUR WHEELS, BEVEL WHEELS.
MITRE WHEELS,

ALSO

FLY WHEELS.
DRIVING PULLIES & DRUMS,

CAN BE SUPPLIED BORED AND TURNED IF REQUIRED.

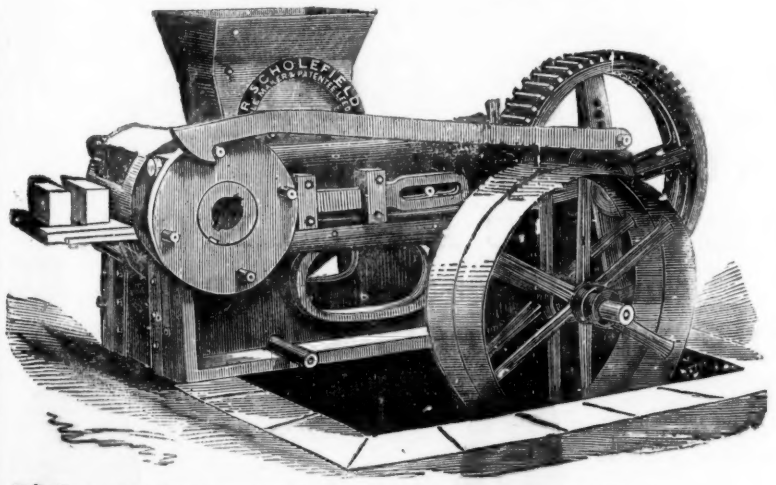
CATALOGUES ON APPLICATION.

LONDON OFFICES:

No. 5, WESTMINSTER CHAMBERS,
VICTORIA STREET,
WESTMINSTER, S.W.

R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

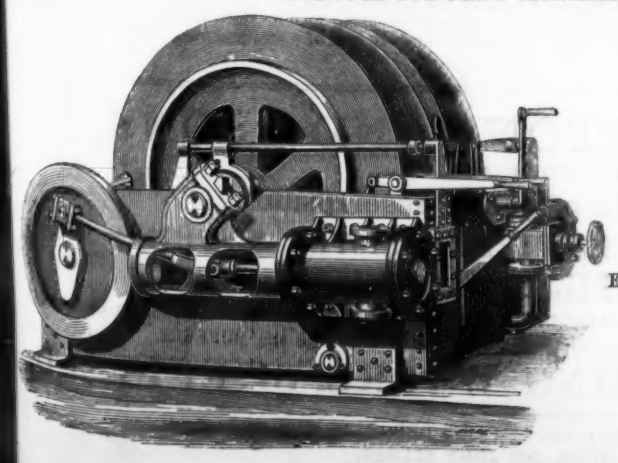
N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS.
KIRKSTAL ROAD, LEEDS.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM,



SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, with 2 ft. 6 in. drums.
Larger sizes made with two cylinders.

A,—	6 in.	double cylinder, with	2 ft. 3 in. drums.
B,—	8 in.	" "	3 ft. 0 in. drums.
C,—	10 in.	" "	3 ft. 6 in. drums.
D,—	12 in.	" "	4 ft. 6 in. drums.

MANUFACTURED BY

THE USKSIDE CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING MACHINERY, AND FORGINGS OF EVERY DESCRIPTION,

NEWPORT, MON

Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDIN
NEWCASTLE-ON-TYNE.

[This Advertisement appears fortnightly.]

ALEXR. WILSON & CO.,

VAUXHALL IRONWORKS,

LONDON, S.W.,

MANUFACTURERS OF

THE VAUXHALL DONKEY PUMPS.
THE EXCELSIOR DIRECT-ACTING PUMPS.
HIGH-PRESSURE SCREW ENGINES
COMPOUND SCREWS ENGINES.
PATENT SURFACE CONDENSING ENGINES.
PATENT PADDLE ENGINES.
HOISTING MACHINERY.

ILLUSTRATED AND PRICED CATALOGUES ON APPLICATION.

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GREENFIELD WORKS,

LLANELLY, S. WALES,

MANUFACTURERS OF THE

Improved Solid Steel Shovels, C. S. Forks, Solid Steel Miners' Shovels, Railway and Miners' Picks, Steel-pointed Spades and Shovels, Draining and Grafting Tools, &c.

ALSO MANUFACTURERS OF

COPPER WORKS' LADLES,

To which special attention is given.

RABBLE HEADS, PADDLES, AND EVERY DESCRIPTION OF LIGHT HAMMERED WORK.

LAMBERT BROTHERS,

Alpha Tube and Fitting Works,

WALSALL.

**Boiler Tubes, Hydraulic Tubes,
Sluice Valves, Hydrants,
Stop ad Draw-off Cocks,
Boiler Mountings,
Safety Valves, Pumps, &c.**

HAND-POWER ROCK DRILL COMPANY (LIMITED).

IMPORTANT IMPROVEMENTS
APPLIED TO ALL EXISTING MACHINES
AT COST PRICE.

RATE OF DRILLING GREATLY INCREASED.

JORDAN'S HAND POWER PATENT ROCK DRILL.

SPECIALITIES—
PATENT PNEUMATIC HAND & STEAM POWER STAMPS, CRUSHING ROLLS, PATENT PROSPECTING PLANT, &c.

T. B. JORDAN, SON, AND MEIHE,
ENGINEERS AND CONTRACTORS,
63, QUEEN VICTORIA STREET, LONDON, E.C.,
AND AT
21 AND 22, LINDENSTRASSE, BERLIN, S.W.

MINERS' LAMP

AND

GAUZE MANUFACTORY,

Established Half-a-century.

JOSH. COOKE AND CO. J.C.B. TRADE MARK

SAFETY LAMPS

A Show Case of Lamps is to be seen at Paris Exhibition, Class 50.

Illustrated Price Lists free, by post or otherwise.

MIDLAND DAVY LAMP WORKS,
BELMONT PASSAGE, LAWLEY STREET,
BIRMINGHAM.

PATENT DUPLEX LAMPS,

FOR COLLIERIES, IRONWORKS, &c.

SUITABLE FOR PIT BANKS, ENGINE HOUSES, &c., &c.

Each Lamp gives a light equal to 26 candles.
No breakage of Chimneys from heat.
Cottons last three months.
Will burn any mineral oil.

S. HOOPER,

LAMP MAKER & OIL MERCHANT,
LOWER TEMPLE STREET,
BIRMINGHAM.

N.B.—Lamps made suitable for every purpose.

The BEST SIGNAL BELL MADE for MINING PURPOSES.

ILLUSTRATIONS ON APPLICATION.

MR. W. F. STANLEY, MATHEMATICAL INSTRUMENT MANUFACTURER TO H.M.'S GOVERNMENT, COUNCIL OF INDIA SCIENCE AND ART DEPARTMENT, ADMIRALTY, &c.
MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every description, of the highest quality and finish, at the most moderate prices.
Price-list post free.
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MAY AND MOUNTAIN,

BIRMINGHAM,

ENGINEERS, MILLWRIGHTS, IRONFOUNDERS, COPPERSMITHS AND BOILER MAKERS,

SOLE MANUFACTURERS OF

TORKINGTON & HEYS'

PATENT LUBRICATOR

FOR

OIL, TALLOW, OR OTHER LUBRICANT.

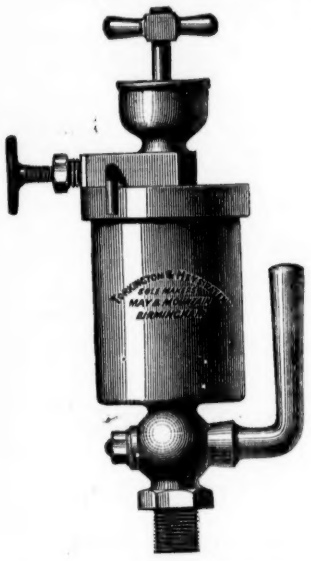
Entirely Self-acting.

The Flow of Grease, being regulated by the Steam, is constant, varying with the amount of Steam used.

No Waste.

Perfect Lubrication.

Greatest possible Economy.



No.	Size. Inches.	Horse-power.	Price.
00	1¼	Agricultural Engines...	8s. 6d.
0	1½		10 6
1	2	5 to 7	14 6
2	2½	7 10	17 6
3	3	10 20	27 6
4	3½	20 30	37 6
5	4½	30 50	47 6
6	5	50 70	60 0
7	6	70 100	90 0
8	7	100 200	105 0

COLEBROOK'S Patent STEAM PUMPS,

THE MOST RELIABLE AND ECONOMICAL DIRECT-ACTING PUMPS.

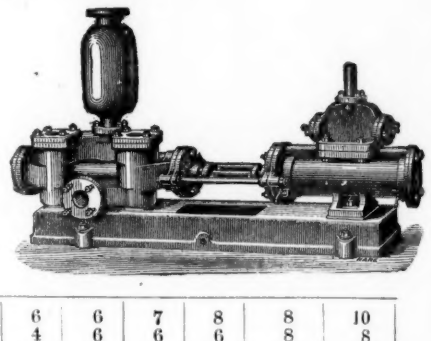
Short Pistons and Long Strokes.

The Slide Valve is worked by the Exhaust Steam alone.

No Tappets, Valves, Levers, or other Mechanical Appliances.

All parts Simple and Easy of access.

Adapted for all purposes and to all circumstances.



PRICES OF A FEW LEADING SIZES.

Steam cylinder ...In.	3	4	4	6	6	7	8	8	10
Water ditto ...In.	1½	2	4	4	6	6	6	8	8
Stroke	12	18	18	18	18	18	18	18	8
Gallons per hour.....	720	1260	5040	4280	9660	8700	7920	12,180	12060
Price .....£	16	19	25	33	41	45	50	65	80

LARGER AND SMALLER SIZES IN ALL COMBINATIONS OF STEAM AND WATER CYLINDERS.

DESCRIPTIVE PRICES ON APPLICATION.

JOSEPH FENTON & SONS,

MANUFACTURERS OF

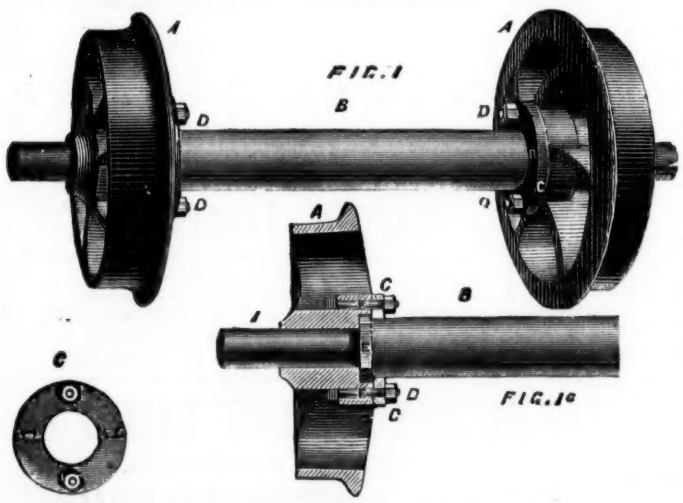
CAST STEEL AND FILES,

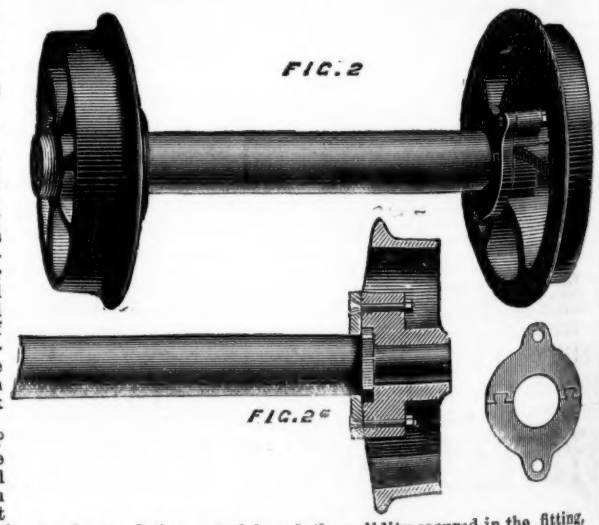
AND

CRUCIBLE CAST STEEL CASTINGS,

Sykes Works, Eyre-st. & Bridge-st., Sheffield. London Office: 118, Cannon-st., E.C.

A New Patent Method of Fitting up Wheels and Axles.





Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

Now what are the advantages of this method? You secure a simple way of fitting—it can be done by anyone who has seen it—the only tool required being a spanner; the wheels can be detached from or secured to the axle in a few minutes. The next advantage is the perfect solidity attained, the wheel and axle practically becoming as one piece. The durability results from the toughness of the material, and the solidity secured in the fitting. Another thing is the wheels do not need to be put in the fire to detach them, as is the case in ordinary wheels. (N.B.—Our wheels cannot be injured by being heated and plunged into cold water, which would render other steel wheels perfectly brittle as glass.) Saving in fuel and wages is evident—no skilled labour being required to refit wheels in case of a strained axle. By adopting this system colliery owners may save hundreds of pounds sterling yearly.

J. J. ARIS AND CO.,

MINING ENGINEERS, MINERAL AND METAL MERCHANTS,

29, FENCHURCH STREET, LONDON, E.C.

Mines inspected and reported upon.

Second Edition. Just published, price 8s. 6d.

A NEW GUIDE TO THE IRON TRADE OR, MILL MANAGERS' AND STOCK-TAKERS' ASSISTANT;

Comprising a Series of New and Comprehensive Tables, practically arranged to show at one view the Weight of Iron required to produce Boiler-plates, Sheet-iron, and Flat, Square, and Round Bars, as well as Hoop or Strip Iron of any dimensions. To which is added a variety of Tables for the convenience of Merchants, including a Russian Table. By JAMES ROSE.

Batman's Hill Ironworks, Bradley, near Bilston.

OPINIONS OF THE PRESS.

"The Tables are plainly laid down, and the information desired can be instantaneously obtained."—*Mining Journal.*

"900 copies have been ordered in Wigan alone, and this is but a tithe of those to whom the book should commend itself."—*Wigan Examiner.*

"The work is replete on the subject of underground management."—M. BANKS Colliery Proprietor.

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MANUFACTURERS OF

MINING STEEL of every description.

CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL

MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS. LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS AND SPRING WORKS, SHEFFIELD.

LONDON OFFICES.—90, CANNON STREET, E.C. PARIS DEPOT—12, RUE DES ARCHIVES.

NEW YORK STORE—102, JOHN STREET.

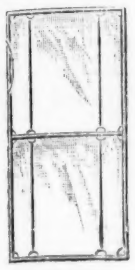
HARRIS'S PATENT WROUGHT-IRON WINDOWS.

DOME AND OTHER ROOF LIGHTS, FLOOR AND PAVEMENT LIGHTS, ETC.

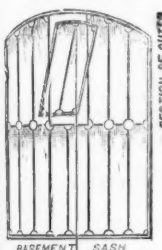
GREAT BRITAIN,
UNITED STATES OF AMERICA,

ARE STRONGER, SUPERIOR, AND CHEAPER THAN ANY OTHER METAL SASHES YET PRODUCED—COST LESS FOR GLAZING—ARE AS CHEAP IN MANY CASES AS WOOD

Private Houses,
Parsonage Houses,
Farm Houses,
Churches,
Chapels,
Schools,


PAIR OF SASHES TO RUN WITH WEIGHTS

WATER-TIGHT WINDOWS

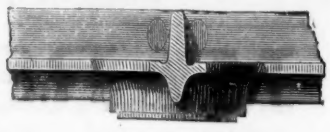

BASEMENT SASH NO GUARD BARS OR SHUTTER REQUIRED

ILLUSTRATED CATALOGUES ON APPLICATION.

In Basement Storeys and Exposed Positions Shutters and Guard Bars are dispensed with.

HOME AND

PATENTED IN

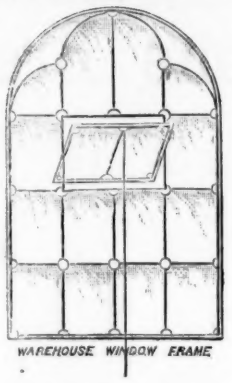


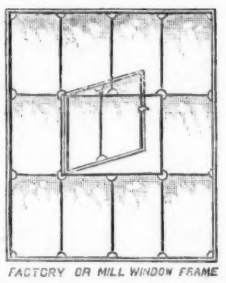
FRANCE,
GERMANY, AND BELGIUM.

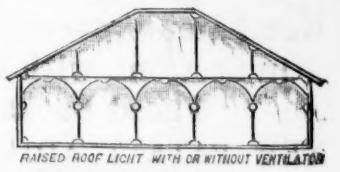
—CAN BE DESIGNED AND MANUFACTURED TO SUIT ANY STYLE OF ARCHITECTURE OR POSITION WHERE A WINDOW MAY BE REQUIRED.

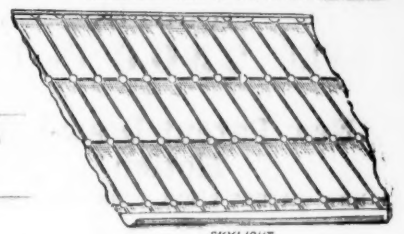
ARE BEING EXTENSIVELY USED IN—

Lunatic Asylums, &c.,
Public Buildings, Banks,
Wharves, Warehouses,
Factories, Mills,
Breweries, &c.,
Engine Houses.


WAREHOUSE WINDOW FRAME


FACTORY OR MILL WINDOW FRAME


RAISED ROOF LIGHT WITH OR WITHOUT VENTILATION


SKYLIGHT

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Security is obtained in these Skylights without Guard Bars, and with less obstruction to Light.

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SOLE MAKER—J. T. HARRIS, Engineer, Ironfounder, and Manufacturer,
SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.
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JOSEPH WRIGHT AND CO.

(LIMITED),

NEPTUNE FORGE ENGINE AND BOILER WORKS,

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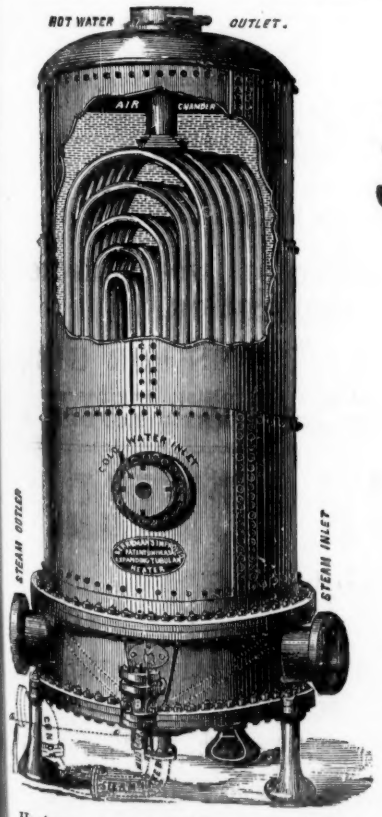
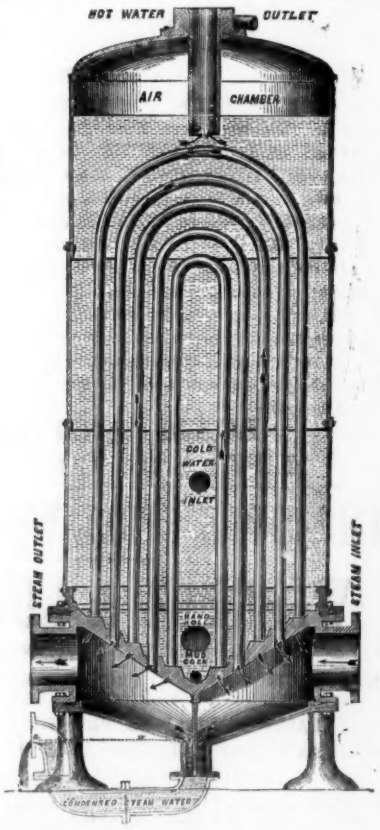




Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL to METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUNDRED AND THIRTY-THREE of these Heaters.

At the PARIS EXHIBITION the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION

FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws, in Sections, with Patent Faced Backs.

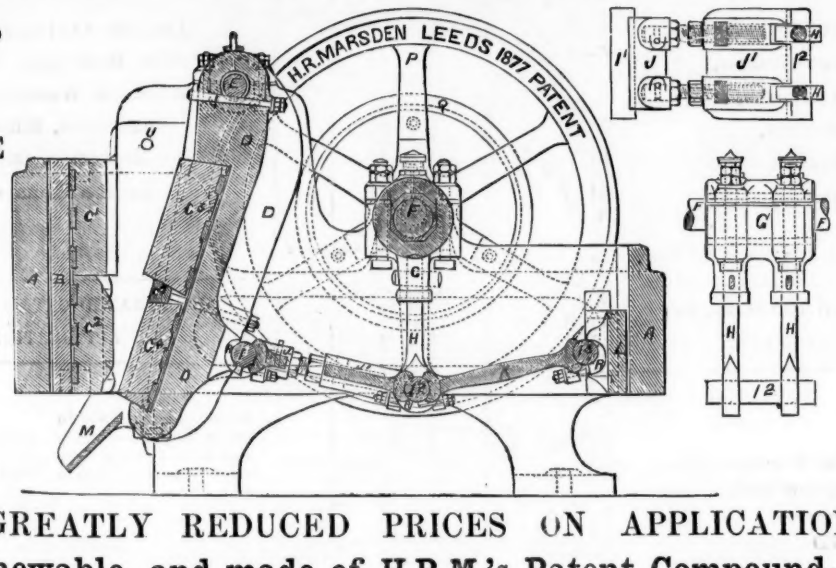
NEW PATENT ADJUSTABLE TOGGLES.

OVER **2500** IN USE.

New Patent Draw-back Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70 PRIZE MEDALS.



READ THIS—

Wharthole Lime Works, Maryport, Whitehaven, November 7, 1873.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2½ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

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R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwts. "dead" weight per corve. Will hold 2 to 3 cwts. more coal than the ordinary kind, *without increasing the outside dimensions.* Adopted by—

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Messrs. CLAYTON and SPEIGHT, Farnley, near Leeds.
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MIDDLETON COLLIERY CO., near Leeds.
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Messrs. KIMBERLEY, Diamond Mines, South Africa.
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Messrs R. HOLLIDAY and SONS, Ardsley, near Wakefield.
HARDWICK COLLIERY CO., Clay Cross, near Chesterfield.
WEST YORKSHIRE IRON AND COAL CO. (Limited), Tingley, near Leeds.
WM. BAIRD and SON, Coatbridge, near Glasgow.
BETTISFIELD COLLIERY COMPANY, Bagillt, Wales.
EDFORD COLLIERY COMPANY, near Bath.
Messrs. JAS. FUSSELL, SONS, and Co., Frome, Somersetshire.
T. VAUGHAN and Co.'s TRUSTEES, South Medomsley Colliery; and others.

R. HUDSON, Engineer and Ironfounder, Gildersome Street Foundry, near Leeds *(Five minutes walk from Gildersome Station, G.N.R.)*

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Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and

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Full particulars of rapid and economical work effected by this machinery, on application.

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BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will work in the hardest rock without more than the usual repairs required by any ordinary machinery, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft. in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most simple rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers,—

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MINING ENGINEERS.
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